AUGUST 1918

THE AGRICULTURAL GAZETTE OF CANADA

FEDERAL LIVE STOCK FEEDING POLICY

THE 1918 APPLE CROP

RURAL CREDITS

HARDY ALFALFAS

GREATER PRODUCTION ON INDIAN RESERVES

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA.

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TO AGRICULTURAL OFFICIALS.

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The Agricultural Gazette
of Canada

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FEDERAL LIVE STOCK FEEDING POLICY

OWING to the scarcity of feed for live stock in extensive areas, more particularly in the southern part of Alberta, Saskatchewan, and part of Manitoba, and to the more plentiful supply in other sections of these provinces, the Honourable the Minister of Agriculture of Canada has entered into an arrangement with the railway companies that has for its object assistance in the transportation of live stock from areas of scarcity to those in which feed is more abundant, and also the transportation of feed into the short-crop areas.

The section of country affected includes that part of the three provinces east of Cochrane and Lundbreck south line of the Canadian Pacific Railway, running from Red Deer to Lacombe, to Kerrobert, to Wilkie, to Saskatoon, and, by Grand Trunk Pacific east of Saskatoon to the eastern boundary about 100 miles west of Winnipeg.

The railways agree to move cattle and sheep to the north at half rate, subject to the minimum rate of 5c. per 100 pounds on cattle, and 6½c. per 100 pounds on sheep, up to November 15th, 1918, shipments to be returned at half rate in reverse direction prior to October 1st, 1919, provided they are returned by the original owner to the original point of shipment.

Hay and straw in carloads are to be carried at half rate in reverse direction from the movement of cattle and sheep as here described, up to May 1st, 1919.

All movements under this arrangement are subject to certificate signed by the Deputy Minister of Agriculture in the province in which the shipping originates. On its part the Dominion Department of Agriculture undertakes to pay the remaining half of the freight rate. The [illegible] live stock and feed will be carried to points within the three provinces free on certificates from the Deputy Minister.

This policy is in line with that applying to the return of feeding and breeding cattle and sheep from stock-yards to the farmers in eastern and western Canada, as outlined in THE AGRICULTURAL GAZETTE of October last—that is to say, the railway companies agree to carry the stock and feed for fifty per cent of the regular transportation rates, and the Federal Department of Agriculture undertakes to pay the remaining portion of the cost.

This agreement was reached after the situation in western Canada had been carefully canvassed by both federal and provincial officials, and it had been found that feed was extremely short in the area herewith outlined, from which large numbers of thin young cattle, sheep, and swine were going to the markets of Calgary and Winnipeg.

REARRANGEMENT OF PUBLIC SERVICE ADMINISTRATION

AFTER very mature consideration, covering a considerable period of time, a re-arrangement has been made of certain public services formerly within the jurisdiction of the Department of Agriculture, Up to the present year, Canada's participation in international expositions abroad, quarantine regulations and matters connected with the public health, the Trade Marks and Design Act, the Timber Marking Act, and the law relating to Patents and Copyrights, have been under the administration of the Minister of Agriculture. These divisions have now been transferred to other departments, as will be seen from the following provisions contained in orders-in-council:

Order-in-council of the 3rd June, 1918, orders that the management of Canada's participation in International Expositions abroad, the administration of quarantine regulations and matters connected with Public Health, be transferred from the Department of Agriculture to the Department of Immigration and Colonization.

Order-in-council of the 3rd June, 1918, orders that the administration of the Trade Marks and Design Act and the Timber Marking Act, be transferred from the Department of Agriculture to the Department of Trade and Commerce.

Order-in-council of the 17th June, 1918, orders that the administration of the law in regard to Patents and Copyrights be transferred from the Department of Agriculture to the Department of Trade and Commerce.

REFUSE SCREENINGS

THE exportation from Canada of refuse screenings produced from cleaning wheat or other grains being prohibited, except by license to be issued by the Collector of Customs when approved by the Canada Food Board, the Canada Food Board under date of July 17th, 1918, made the following regulation under which approval may be obtained:

1. That before the holders of such refuse screenings shall apply for a license for exportation from Canada to be issued by the Collector of Customs, approved by the Canada Food Board, the said refuse screenings shall be offered for sale in the same manner as grain is offered for sale on the open floor, during trading hours, on the Winnipeg or Fort William Grain Exchange, and a record shall be kept by the secretary of the said exchange, and that no approval of the Canada Food Board for exportation will be given until the record be authenticated by the secretary of the grain exchange on which same was offered for sale certifying same to have been a *bona fide* sale at the highest price obtainable on said exchange at the time of sale.

2. All other orders made by this Board relative to refuse screenings are hereby cancelled.

THE MEAT AND CANNED FOODS ACT

THE INSPECTION OF PRESERVED FRUITS, VEGETABLES, AND MILK

HIS Excellency the Governor-General in Council, on the recommendation of the Minister of Agriculture, has been pleased to order under date of June 15, 1918, that the regulations covering the inspection of preserved fruits, vegetables, and milk, approved by Order in Council on July 6, 1910, be repealed and revised regulations substituted in lieu thereof.

The first two regulation of the new order are the same as those previously in force. Section 3, which is entirely new, provides that every establishment operating under the provisions of the Meat and Canned Foods Act shall, within one month after the date upon which the regulations come into force, mail to the Minister of Agriculture by registered letter, an application for a permit to continue in operation; and, in case no permit is received within sixty days from the date of mailing such letter, the establishment must discontinue export or interprovincial business. No establishment can hereafter commence operating without first obtaining from the Minister a permit. In case the Minister has reasonable ground to believe that any establishment has committed a violation of any of the provisions of the Act, or of these regulations, he can upon ten days' notice cancel the permit.

Sub-section (b) of the thirteenth regulation provides that a true and correct description of the contents of the container, as is, or may be, defined in the appendices to these regulations, shall be given on the container. Sub-sections (c) and (d) of the same section have been added. They provide that all packages must be marked as required in the section with the names and addresses of the firm or corporation, of the packer, or of the first dealer obtaining the package directly from the packer, together with the permit number which has been assigned to the establishment, and that owners or managers of establishments shall supply to the Veterinary Director General duplicate copies of all labels, stencils or lithographed designs used in the establishment, one copy to be filed with the Veterinary Director General and the other copy to be retained by the owner or manager and to be produced when required by an inspector.

Section 16, which refers to importations, has been added and is of such importance to both officials and shippers that it is herewith given in full as follows:

> No person shall import, nor shall there be imported any fruit, or vegetables, or fruit or vegetable products, canned, bottled, dried, evaporated or otherwise preserved for food, or any milk, condensed, evaporated, dried, or otherwise preserved for food, unless the requirements of this section are strictly adhered to.
>
> (a) Collectors of customs shall not clear any importation of fruit, or vegetables, or fruit or vegetables products, canned, bottled, dried, evaporated, or otherwise preserved for food, or any milk, condensed, evaporated, dried, or otherwise preserved for food, unless such shipment is accompanied by an affidavit taken before a Justice of the Peace, or other person duly authorized (in the country of origin) to attest such declarations in the following form:—
>
> Place........................
> Date........................
>
> To the Collector of Customs,
> Dominion of Canada,
>
> I, (or we).............hereby declare that the shipment described herein was

manufactured from sound, raw materials, and that its manufacture was carried on under the sanitary conditions provided for in these regulations, that the products are at the time of shipment sound, wholesome, and fit for human food; that the containers and packages show thereon the true name and address of the manufacturer, and that the description of the contents is true and correct and conforms to the requirements as set forth in the appendices of the regulations made under the Meat and Canned Foods Act of the Dominion of Canada.

....
(Signature and address of shipper).

Name and address of consignee.........
No. of packages.....................
No. of containers in each package........
Name of product ....
Sworn to before me this......day of..19..

....
(Signature of Commissioner, or Justice of the Peace)

(b) All fruit or vegetables, or fruit or vegetable products canned, bottled, dried, evaporated or otherwise preserved for food or any milk, condensed, evaporated, dried, or otherwise preserved for food, shall be subject to such inspection in the Dominion of Canada, as may be deemed necessary or advisable, and any fruit, or vegetables, or fruit or vegetable products, canned, bottled, dried, evaporated, or otherwise preserved for food, or any milk, condensed, evaporated, dried, or otherwise preserved for food, that does not conform to the requirements of these regulations and the appendices thereto, shall, upon condemnation by an inspector be forfeited to His Majesty, and may be disposed of as the Minister may direct.

(c) Collectors of customs shall attach the certificate referred to in this section to their B-1 entry form and forward same to the Commissioner of Customs.

Section 17, which is also new, provides that these regulations shall apply to all products that may be manufactured or imported on or after July 1, 1918, and that manufacturers may have until January 1, 1919, to dispose of any product covered by these regulations which they have on hand July 1, 1918.

Section 18 requires that collectors of customs shall see that the various exigencies and provisions of these regulations are fulfilled before granting any permit and shall report at once any infraction of the regulations to the Minister.

Following the regulations are appendices containing a definition of the terms used. These, in the first place refer to the containers, the label, standards of quality, head space, and the degree of syrup. Appendix (a) has reference to fruits and vegetables and certain of their products and contains notes relative to experimental work and the manner in which it should be conducted. Appendix (b) has reference to milk and its products and the standards adopted by the Department of Inland Revenue which have been included in the regulations. Appendix (c) has reference to grades of quality and quantity of apples, raspberries, cherries, peaches, pears, strawberries, beans, corn, peas, tomatoes, beets, pumpkins, and squash.

THE INSPECTION AND SALE ACT

THE GRADES OF HAY AND STRAW

An Act was passed at the recent session of Parliament in amendment to part X of the Inspection and Sale Act (Chapter 85 of the Revised Statutes of 1906), having reference to hay and straw. Sections 340, 341, and 342 of the said Act were repealed and are partly re-quoted in the amending Act.

Section 340 is amended by providing the grades of hay for the eastern provinces; instead of the one set of grades being applicable, as formerly, to the entire country.

THE EASTERN DIVISION

Ontario, Quebec, Nova Scotia, New Brunswick, and Prince Edward Island constitute the Eastern Division, with the following as the grades: Prime Timothy, No. 1 Timothy, No. 2 Timothy, No. 3 Timothy, No. 1 Clover, No. 2 Clover, Mixed Hay, No Grade, and Shipping Grade.

To the sub-section referring to "No. 1 Clover," "No. 1 Clover Mixed" is added and described as "timothy and clover mixed, with at least one-half timothy of good colour and sound."

Sub-sections are also added as follows:

> No. 1 Dyke shall be timothy and couch with not more than one-eighth of clover or other tame grasses mixed.
>
> No. 2 Dyke shall be timothy and couch with not more than one-third of clover or other tame grasses mixed, of fair colour, sound, and well cured.

Another addition provides that "rejected" shall include all hay that is musty or heated. There is some further reorganization of the section by the adoption of provisions taken from Section 342.

THE WESTERN DIVISION

Section 340 (b) gives the Western Division for the grading of hay as Manitoba, British Columbia, Saskatchewan, Alberta, and the North West Territories. For this division, tame grasses are described as including, Choice Timothy Hay, Nos. 1, 2, and 3 Timothy Hay, Nos. 1 and 2 Timothy Clover Mixed, Nos. 1, 2 and 3 Rye grass, Brome, Orchard grass, or Alfalfa, and "No Established Grade," the last mentioned taking in all the hay not otherwise classified. The wild grasses for this division are described in the Act as Choice Prairie Hay and Nos. 1, 2, 3 and 4 Prairie Hay. "No Grade Hay" is defined to comprise all hay that is damp or otherwise unfit for storage, and "Rejected Hay" as consisting of hay containing more than twenty-five per cent of foxtail or spear grass, or hay heated, or containing must or mould, or otherwise damaged, and including all hay not good enough for other grades.

STRAW

Section 340 (c) describes the grades for straw as Nos. 1 and 2 Straw, No Grade Straw, and Musty and Heated Straw, the last named being graded as "rejected."

Section 340 (d) explains the duties of the inspecting officers.

IMPORTATIONS

Section 340 (e) provides that when hay is imported into Canada, it shall be inspected and graded in accordance with the provisions of the Act.

TAGS REQUIRED

Section 340 (f) requires every

seller of baled hay or straw to affix a tag bearing his name and address and the weight of the bale.

Section 340 (g) provides a fine of five dollars for failure to affix this tag.

THE FEES

Section 341 gives the Governor-in-Council power to prescribe the fees that are to be charged for the inspection of hay and straw.

FRAUDULENT PRACTICES

Section 342 provides that any person who puts foreign matter into any bale of hay intended for sale which improperly increases its weight, or which prejudicially affects the quality, shall be liable to a fine not exceeding forty dollars for the first offence and not exceeding one hundred dollars for every subsequent offence; also that any person who puts any foreign matter into a bale of straw for sale which improperly increases the weight, or which prejudicially affects the quality of the bale, shall be liable to a fine not exceeding twenty-five dollars.

THE LIVE STOCK AND LIVE STOCK PRODUCTS ACT

THE GRADING AND MARKING OF EGGS

HIS Excellency the Governor-General in Council, on the recommendation of the Minister of Agriculture, and under and in virtue of the provisions of sub-section (c) of Section 9 of "The Live Stock and Live Stock Products Act, 1917," has been pleased to approve the regulations herewith given respecting the grading and marking of eggs:

1. Canadian eggs for export out of Canada and eggs for domestic consumption intended for shipment from one province to another, but not including eggs intended for incubation shall be classified and graded as follows:—

Class (1) Fresh eggs which have not been held under refrigeration at a temperature of 40° or less except when in transit or subjected to artificial preservation

Grade (a) Specials—Eggs of uniform size, weighing 25 ozs. to the dozen or over or 47 lb. net to the 30-dozen case; clean and free from stain, strong and sound in shell; air cell small, not over 3-16 of an inch in depth; white of egg to be firm and clear and yolk dimly visible.

Grade (b) *Extras.*—Eggs of good size, weighing at least 24 ozs. to the dozen or 45 lb. net to the 30-dozen case; clean; sound in shell, air cell less than 3-8 inch in depth; white of egg to be firm and yolk slightly visible; maximum allowance at time of inspection not to exceed 2 p c. variation from the grade stated.

Sub-grade (1) *Pullet Extras*—Eggs which have the quality of extras but which fall short in weight shall be known as pullet extras, providing they weigh at least 20 ozs. to the dozen, or 37½ lb. net to the 30-dozen case.

Grade (c) *No. 1's or Firsts*—Eggs weighing at least 23 ozs. to the dozen or 43 lb. net to the 30-dozen case; reasonably clean; sound in shell; air cell less than ½ inch in depth; white of egg to be firm; yolk may be distinctly visible but mobile; air cell stationary; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (d) *No. 2's or Seconds*—Eggs sound in shell; may contain weak, watery eggs and eggs with heavy yolks, and all other eggs sound in shell and fit for food.

Class (2) *Storage Eggs* which have been "held" under artificial refrigeration at a temperature of 40° or less.

Class (2a) *Preserved Eggs* which have been subjected to any process, liquid or otherwise, intended to preserve their quality.

Grade (a) *Extra Eggs* of good size, weighing at least 24 ozs. to the dozen or 45 lb. net to the 30-dozen case; clean; sound in shell; air cell less than 3-8 inch in depth; white of egg to be firm and yolk slightly visible; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (b) *Extra Firsts*—Eggs weighing at least 23½ ozs. to the dozen or 44 lb. net to the 30-dozen case; clean; sound in shell; air cell less than 3-8 inch in depth; white of egg to be firm; yolk may be moderately visible but mobile; air cell stationery; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (c) *No. 1's or Firsts*—Eggs weighing at least 23 ozs. to the dozen or 43 lb. net to the 30-dozen case; reasonably clean; sound in shell; air cell less than ½ inch in depth; white of egg to be firm; yolk may be distinctly visible but mobile; air cell stationary; maximum allowance at time of inspection not to exceed 2% variation from the grade stated.

Grade (d) *No. 2's or Seconds*—Eggs sound in shell, may contain weak, watery eggs and eggs with heavy yolks, and all other eggs sound in shell and fit for food.

Class (3) *Cracked and Dirty*—Eggs, shells of which have been checked or broken, smeared, soiled, or damaged in shell, but fit for food.

2. Every case containing Canadian eggs intended for export out of Canada shall be marked on both ends in a legible and indelible manner, with the class and grade of eggs contained therein, and the words "Canadian Eggs", and every case containing eggs that are to be shipped from one province to any other province in shipments of 100 cases or more, shall be marked on both ends with the class and grade of the eggs contained therein, and with the name of the country of origin when other than domestic product. The Minister may from time to time prescribe the form and the size of the letters that are to be used in such markings. Such marks may be accompanied by other trade designations or brands, providing such designations or brands are not, in the opinion of the Minister, inconsistent with or marked more conspicuously than the marks prescribed in these regulations.

3. Canadian eggs for export out of Canada shall be tightly packed in Canadian standard cases in new white fillers and flats, with kiln dried excelsior or corrugated cushions at top and bottom, or one-third fillers on bottom with flats over top and under bottom fillers.

4. Canadian standard cases shall be made to contain thirty dozen eggs. They shall be made of clean, dry and odorless wood. The ends and centre partition shall be not less than five-eighths of an inch thick, the sides, top and bottom not less than three-eighths of an inch thick.

5. Cases containing Canadian eggs in lots of twenty-five cases or more intended for export out of Canada, and eggs intended for shipment from one province to another province in shipments of 100 cases or more, shall not be shipped until they have been inspected and marked by an inspector.

6. The mark of approval to be placed on each case, hereinafter called the "Government Mark," shall include the Maple Leaf and the words "Canadian Eggs," and "Government Inspected," together with the inspector's number, the device to be in such form as the Minister may approve.

7. Before the Government mark is placed upon any case, the inspector shall draw samples of at least five per cent of the cases to be marked and shall examine at least one-half of the eggs in each case. The inspector shall satisfy himself that the samples taken are representative and shall take any further samples and make any further examination that he deems necessary.

8. No cases containing eggs shall be marked with the Government mark unless the warehouse or rooms in which the eggs are held are in a clean and sanitary condition, and, further, no cases shall be marked unless suitable accommodation is provided for inspectors to make the necessary examination, such accommodation to include a dark room, facilities for candling, and such fittings as may be required to insure a proper examination.

9. No person other than a duly appointed inspector shall apply any Government mark to any cases containing eggs.

10. After the contents of any case bearing the Government mark have been removed, such mark shall be obliterated. This shall be done by the person or persons removing the eggs from the case.

11. Collectors of Customs throughout Canada shall not allow any Canadian eggs to be shipped for export out of Canada that are not marked in accordance with these regulations.

PART I

Dominion Department of Agriculture

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

THE COMPOSITION OF BRAN AND SHORTS AS MILLED UNDER THE REGULATIONS OF THE CANADA FOOD BOARD*

BY FRANK T. SHUTT, D.Sc., AND R. L. DORRANCE, B.A.

THE tremendous and ever-increasing demand for Canadian flour for military and civilian use overseas has compelled the Canada Food Board, in order as far as possible to meet these requirements, to issue regulations "lengthening" the milling extraction, which means that the Board has ordered the production of more flour from a given weight of wheat than was customary in pre-war times, indeed, until April of the present year, the date of the new regulations.

Hitherto, it has been the practice of Canadian millers to make 196 pounds of flour from about 270 pounds of wheat—approximately 72.5 per cent extraction—10 pounds of which flour (of lower grades) being generally used in the preparation of middlings. This resulted in, approximately, 81 pounds of offal—bran, shorts and middlings—from 270 pounds of wheat.

Under the new regulations it is required that as regards spring wheat of the Prairie Provinces—196 pounds of flour shall be made from 258 pounds of wheat—practically a 76 per cent extraction—this flour being known and sold as "Government Standard Flour." The making of feed flour, commonly known as Red Dog, and of middlings, is prohibited. The result is that about 59 pounds of bran and shorts are milled from 258 pounds of wheat—a reduction of approximately 25 per cent in the amount of feed, compared with that made before the regulations came into force. These facts explain in a large measure the present shortage of, and difficulty in, obtaining bran and shorts and, further, explain why the floury, mealy middlings, so valuable in pig and calf feeding, are no longer obtainable.

Fifteen years ago a collection of samples of bran and shorts, representative of the output of the leading flour mills of the Dominion, was analysed in the laboratories of the Experimental Farm, the series affording the following data:

AVERAGE COMPOSITION OF BRAN AND SHORTS, 1903

	Bran	Shorts
Moisture	11.07	10.34
Protein	14.52	15.93
Fat	4.37	5.24
Carbohydrates	54.19	59.58
Fibre	10.14	5.23
Ash	5.71	3.68
	100.00	100.00

---

*Contribution from Laboratories of Dominion Experimental Farms; summary of paper read before Section III, Royal Society of Canada, May, 1918.

Bran.—In this series the protein varied from 13.25 per cent to 15.31 per cent; the fat from 3.60 per cent to 5.19 per cent, and the fibre from 9.28 per cent to 10.93 per cent.

Shorts.—Corresponding figures for the shorts were, protein from 15.15 per cent to 17.00 per cent; fat from 3.98 per cent to 6.23 per cent, and fibre from 3.82 per cent to 7.51 per cent.

During the autumn months of last year (1917) further and larger collections of these feeds were made and analysed, with the following results:

AVERAGE COMPOSITION OF BRAN AND SHORTS, 1917

	Bran	Shorts
Moisture	9.51	9.81
Protein	15.09	16.03
Fat	4.38	4.97
Carbohydrates	55.73	58.04
Fibre	9.62	6.90
Ash	5.69	4.25
	100.00	100.00

Bran.—The limits of variation are, protein 13.23 per cent to 16.75 per cent; fat 3.21 per cent to 5.49 per cent; fibre 7.64 per cent to 11.68 per cent.

Shorts.—Corresponding results for this feeding stuff are, protein 15.04 per cent to 18.06 per cent; fat 3.80 per cent to 6.04 per cent, and fibre 5.83 per cent to 8.88 per cent.

Comparing these two series, collected thirteen years apart, the differences in composition are not, on the whole, such as to call for extended comment, though in the 1917 series the higher percentage of fibre in the shorts, appear to be significant of certain milling changes that have taken place during that period.

Subsequent to the coming into force of the new regulations (April, 1918) samples of bran and shorts were obtained direct from the mills of a number of the leading firms, and submitted to analysis.

AVERAGE COMPOSITION OF BRAN AND SHORTS SUBSEQUENT TO NEW REGULATIONS OF CANADA FOOD BOARD, (76% EXTRACTION)

	Bran	Shorts
Moisture	7.13	7.22
Protein	15.83	17.67
Fat	4.98	5.16
Carbohydrates	55.20	57.25
Fibre	11.51	8.52
Ash	5.35	4.18
	100.00	100.00

Bran.—The series showed the following limits: protein, 15.69 per cent to 16.03 per cent; fat, 4.85 per cent to 5.09 per cent; fibre 11.08 per cent to 12.18 per cent.

Shorts.—Corresponding limits in the series of shorts samples were protein 16.84 per cent to 18.41 per cent; fat, 4.77 per cent to 5.65 per cent; fibre 8.23 per cent to 9.12 per cent.

It may first be observed that in both the bran and shorts the samples of the 1918 series show less variation in composition than those of the two preceding series, indicating the closer standardization of the milling process under the new regulations. This will be apparent from the following table:

LIMITS OF VARIATION

	1903	1917	1918
Bran—			
Protein	2.06	3.52	.34
Fat	1.59	2.28	.24
Fibre	1.69	4.24	1.10
Shorts—			
Protein	2.17	3.02	1.57
Fat	2.25	2.24	.88
Fibre	3.69	3.49	[illegible]

Comparing the composition of the bran and shorts milled under the regulations with these feeds as previously manufactured we find.

1. That the bran now made (regulations of April, 1918), is approximately, .75 per cent richer in protein, .5 per cent richer in fat, and contains 1.5 per cent more fibre.

2. That the shorts under the new regulations are approximately 1.75 per cent richer in protein, very similar in fat content, and contain about 2.5 per cent more fibre.

These results are in the direction that might have been anticipated, for the closer extraction of the floury particles (essentially starch) under the new regulations would more particularly increase the percentage of protein and fibre, which are characteristic of the bran coats constituents of wheat. The greatest difference is found in the shorts, which now more closely approach fine bran, and from which are absent the small percentages of low grade flour which hitherto gave them their mealy, floury condition.

Bran and shorts are legally defined under Section 26 of the Food Adulteration Act. They must conform to the following limits of composition to be accounted genuine:

LEGAL LIMITS OF BRAN AND SHORTS

	Bran %	Shorts %
Protein, not less than...	14	15
Fat, not less than......	3	4
Fibre, not more than....	10	8

While the standards may have been sufficiently fair in pre-regulations times, the results of our recent analyses would indicate that they are not well suited to the bran and shorts milled under present regulations. The following may be tentatively suggested, as apparently meeting these products under the new milling:—

	Bran %	Shorts %
Protein, not less than...	15.	16.5
Fat, not less than......	4.5	4.5
Fibre, not more than....	12.0	9.0

Nothing very definite can be said about the digestibility of the new bran and shorts, as no digestion experiments have been made with these feeds, but the probability is that, as far as dairy cows and steers are concerned, there will be very little difference from the pre-regulation feeds—the somewhat higher protein content may be largely offset by the larger percentage of fibre, but, in the case of young pigs and calves, it may fairly be concluded that the new shorts, owing to their more fibrous character, will not be so nutritious or suitable.

THE WOLFRYN ELECTRO-CHEMICAL PROCESS FOR THE TREATMENT OF SEED GRAIN

BY FRANK T. SHUTT, D.Sc., DOMINION CHEMIST

DURING the autumn of 1916 and the early months of 1917 we received a number of letters from the patentees of this process, setting forth the advantages to be obtained by its use in increased yields of grain and giving data from experiments conducted in England and Scotland which showed gains from its employment from 25 to over 100 per cent.

Briefly, the process consists in passing a current of electricity through a solution of common salt (or other chemical) in which the seed grain is immersed, the treatment being made in a water-tight rectangular tank with ends covered inside with sheet-iron plates carrying terminals for affixing the wires for the conduct of the electric current. For 10 bushels of grain, which would require 50 gallons of solution, the instructions of the patentees read as follows: "After the solution (1 pound of salt to 1 gallon of water) has been made ready in the tank and before the grain is placed therein, it should be submitted to an electric current 50 gallons to 6 kilowatts for 5 minutes, or 3 kilowatts for 10 minutes, or 1½ kilowatts for 20 minutes, or 1 kilowatt for 30 minutes. After this preparatory treatment of the solution the grain should be placed therein and treated with 4 watts per gallon of solution (200 watts for 50 gallons—that is, 1 ampere at 200 volts, 2 amperes at 100 volts, or 4 amperes at 50 volts and so on). Wheat should be treated for 2½ hours, barley and oats for 4½ hours". Presumably, "direct" current is intended, but no statement to that effect is made.

On writing the patentees as to what the underlying theory of the treatment might be, they replied: "We have so far reached only a provisional theory, that our process is bacteriological. We use antiseptics or disinfectants, which check or destroy the vital activity of two groups of organisms that exist in the soil. One of these, which is included in the protozoa and is inimical to plant life, is more readily destroyed by the above chemicals than are the nitrogen-assimilating bacteria which are beneficial to plant life. By submitting solutions of these chemicals to electrolytical decomposition their antiseptic value is increased and when grain is treated in these solutions, it becomes saturated with them, which aids the germination of the embryo plant, supplies it with additional nutriment and with a means of combatting its enemies in the soil, etc."

Our trial of the process was made with Marquis wheat in 1917 on the Central Farm, Ottawa. A series of four plots, each 1/7 acre, was used for the experiment. On No. 1, untreated grain was sown; on No. 2, grain was sown that had been immersed in water; on No. 3, grain that had been immersed in a 10 per cent solution of common salt, and on No. 4, grain treated by the Wolfryn process. The following table gives the essential particulars of the experiment, including the yields of grain and straw obtained:

THE ELECTRIC TREATMENT OF SEED-WHEAT BY THE "WOLFRYN" METHOD, 1917

Plot No.	Treatment of the Seed Grain	Duration (in hours) immersion and treatment	Date treatment	Date seeding	Date of harvesting	Yield (in bus.) of grain per acre	Yield* (in lb.) of straw per acre
1	Untreated..............	—	—	May 16	Aug. 15	14.23	2506
2	Immersed in water......	2½	May 8	"	"	14.00	2730
3	Immersed in 10 p.c. solution of sodium chloride	2½	"	"	"	13.41	2590
4	Immersed in 10 p.c. sodium chloride and subjected to direct electric current. Total volume of solution 40 gallons, (⅓ kilowatt hours).........	2	May 9	"	"	11.55	2842

*Unfortunately, the plots were somewhat weedy, and in consequence the weights of straw, as above, are to be regarded as approximations only.

Plot No. 4, sown with the electrically treated wheat, gave the lowest yield of grain in the series. We do not, however, attribute this lower yield to any injurious effect of the treatment, for the grain on this plot germinated well and made a good stand in the early part of the season. It would seem very probable that the differences in yield were due rather to lack of uniformity in the quality of the soil and possibly in some measure to the somewhat greater weed growth on plot 4.

On the other hand this experiment furnished no evidence that the treatment is beneficial. Neither the appearance of the standing crop, nor the weight of the harvested grain, lent any support to the claim made by the patentees that the treatment stimulates growth and produces conditions which result in increased yields.

We admit that these results have not been obtained under the most favourable of plot conditions for a strictly scientific and critical study of the process; a further experiment might very well place the yield from the "processed" seed higher up in the series. But in our opinion there are no indications, either from a consideration of the theoretical basis of the treatment or of our field results, that would justify at present the patentees' claims. It will be necessary to bring forward further, and more satisfactory, evidence before it can be said that the process has an economic value.

NOTE.—The electrical treatment of seed tested by Dr. Shutt should not be confused with the "Overhead Electric Discharge" for increasing crop production—an entirely different matter and one that promises well, judging from certain results obtained in England and Scotland.—Editor.

THE DIVISION OF FORAGE PLANTS

THE WINTERING OF ALFALFA

BY F. S. BROWNE, B.S.A., ASSISTANT TO DOMINION AGROSTOLOGIST

THE winter of 1917-18, although unusually severe, has not caused any extensive loss of alfalfa on any of the Dominion Experimental Farms and Stations where alfalfa has been a dependable crop in the past. Generally speaking, alfalfa has wintered perfectly where the seed has been home grown, or where hardy variegated varieties, such as Grimm's Baltic, Liscombe, etc., have been used. The prairie farms and stations have also had excellent success with the Turkestan variety. The data secured during the past has clearly shown the superiority of northern grown seed from a standpoint of winter hardiness, and, accordingly, such seed has been almost entirely planted by the Dominion Experimental Farms system.

ALFALFA PLOTS AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA; GROWN FROM HOME-GROWN SEED

HARDY ALFALFAS IN PRINCE EDWARD ISLAND

BY J. A. CLARK, B.S.A., SUPERINTENDENT OF EXPERIMENTAL STATION, CHARLOTTETOWN

MANY varieties of alfalfa have been tested at the Charlottetown Station. The different strains of Grimm, Baltic, and Ontario Variegated have proved to be equally hardy, and quite superior to common alfalfa, Turkestan, and Northern Michigan. We have invariably secured a good stand of alfalfa the first year after seeding, and when sown in rows it has usually wintered well for two or three seasons.

In the spring of 1917 our plots of alfalfa, and also the different lots that were sown in rows, started nicely in April, grew two or three inches, and then were attacked by some disease which killed them at the crown, the root remaining firm and sound. The decay caused by the disease gave a distinct odour, like rotten potatoes. Some of these plants have lived through the present winter, and are looking strong and vigorous. An acre and a half of Grimm alfalfa, sown last year, has come through the winter in good condition, and looks quite promising. It was sown with barley as a nurse crop, the barley being seeded at the rate of one bushel per acre.

Our experience with alfalfa for some nine seasons has led us to think that the crop is about as sure as red clover is in this province; and while on an average it has not lived longer than you would expect red clover to stay in the soil, there is always the possibility that it will remain for years. On the lighter soils of Kings County, alfalfa is more satisfactory than it is in the western part of the province.

THE DIVISION OF POULTRY

THE LATE VICTOR FORTIER

BY the sudden death of Mr. Victor Fortier, which happened recently, the Experimental Farms Branch has been deprived of the services of an officer who filled the important position of Assistant Dominion Poultry Husbandman. At the time of his demise, Mr. Fortier was delivering a series of lectures on poultry topics in Eastern Quebec and the Maritime Provinces. Born in the county of Soulanges fifty-one years ago, after serving some time as collector of Inland Revenue at St. Therese and St. Jerome, he joined the staff in 1903 of the Dominion Department of Agriculture, where his knowledge, obtained by practical experience as poultry keeper, fancier and exhibitor, led to his appointment to the position which he occupied at the time of his death. He was particularly closely in touch with the poultry situation in Eastern Canada and made frequent tours as judge and lecturer in that section of the country. He was the author of several publications on poultry raising and was a frequent contributor to the agricultural press on the same topic. Only a few days before his passing, he completed the manuscript of a bulletin on "Rabbit Raising," which is being published.

THE ENTOMOLOGICAL BRANCH

SOME NOTES ON THE NATURAL CONTROL OF THE CHERRY-TREE UGLY NEST TORTRICID, *Archips cerasivorana* FITCH

BY A. B. BAIRD, DOMINION ENTOMOLOGICAL LABORATORY, FREDERICTON, N.B.

THE Choke Cherry, (*Primus virginiana* Linn.), is familiar enough to most of us in both eastern and western Canada. Everyone who has driven along our country roads during late June and early July must have seen the large tent-like webs of the ugly nest tortricid, (*A. cerasivorana* Fitch). Occasionally, this insect becomes very abundant over large areas, (Fig. 1) and makes the cherry trees unsightly, but its depredations are usually confined to rather local areas. Although there are numerical fluctuations from year to year, yet over periods of years the insect remains more or less constant in numbers. This constancy is brought about by means of various natural agencies, some of which will be discussed briefly in the following pages. For convenience the various factors will be taken up in the order of their attacking the insect from egg to adult. The studies which form the basis for these notes were made largely at Fredericton, N.B., although a small amount of data was secured from material gathered at Red Deer, Alberta.

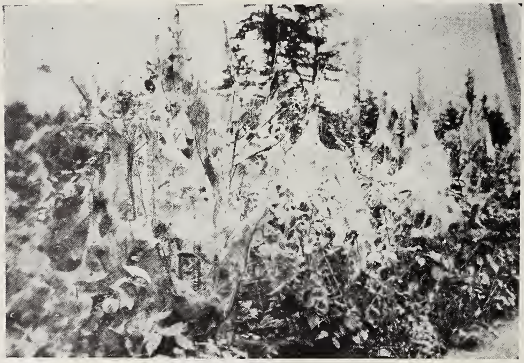


FIG. 1—A ROADSIDE SCENE NEAR A BEAVER MEADOW, QUEBEC PROVINCE, JULY 1, 1915. WEBS OF THE CHERRY-TREE UGLY-NEST TORTRICID

CONTROL IN THE EGG STAGE

The insect spends about nine months of the year in the egg stage. The eggs are deposited late in July or early in August, and very little development of the embryo takes place until the following spring. They are laid in flattened masses, which may contain anywhere from twenty-five to two hundred eggs and are placed on the bark of the cherry trees, chiefly on the smaller ones near the base of the trunk. More than seventy-five per cent of the masses are usually deposited within four inches of the ground (Fig. 2).

Parasites.—Only one species of egg parasite has been reared by the writer. This is a minute hymenopterous fly described by Girault, (Can. Ent. Vol. 48, page 268), as *Trichogrannatomyia tortricis.* Its full life-cycle has not as yet been studied, but it probably spends about four or five weeks in the host egg, as the adults emerge during the end of August and beginning of September. Occasionally, this parasite is very effective. In 1917, for instance, it killed between seventy-five and eighty per cent of the host eggs. More often, however, the usefulness of this parasite is curtailed through the killing of the eggs by another cause.

Other factors.—As a rule, more than seventy-five per cent of the eggs are destroyed by an agency, the nature of which is not yet clear. The affected egg masses become deadened and whitish in appearance and microscopic examination shows the contents to have entirely disappeared without there being any apparent openings in the exposed surfaces. Several specimens of a tiny mite have been found in the eggs, but it was not possible to determine whether or not they had been feeding on the contents.

Several masses collected at Fredericton, N.B., shortly after decomposition, in 1916, showed numerous tiny, brownish mite-like eggs on the underside of the insect eggs next the bark, but these may have had no significance in connection with the egg mortality. The work of destruction takes place in New Brunswick between the middle of August and the latter part of September. Another possible cause of this destruction is that early frosts may kill the eggs before the winter snows come to afford them more equitable conditions for hibernation.

FIG. 2—SEVERAL EGGS OF *A. CERASIVORANA;* MASSES AT THE BASE OF THE CHERRY TREE

CONTROL IN THE LARVAL STAGE

The eggs of the Ugly Nest Tortricid hatch in the latter part of May and during early June, varying somewhat according to their location. The larvae from an egg mass all emerge, as a rule, within twenty minutes, and immediately crawl to the top of the main stem or one of the larger branches where they congregate in the opening leaves, spin a web about themselves and commence to feed, (Fig. 3). The larvae always feed under protection of the web and when fresh food is required they extend their web over the foliage before eating it. Fig. 4 shows several larvae engaged in the process of extending the web. This habit is of great importance in the control of the insect as the web affords excellent protection from adverse weather conditions, as well as from the attacks of parasites and predators. Until after the third moult the larvae merely skeletonize the leaves in feeding but after that they devour the entire leaf tissue. Practically all the excreta or frass is kept in the web and as soon as there is a sufficient accumulation of this the larvae construct among it silk-lined cells in which they live individually when not at work. There are six larval instars. Most of the larvae are full grown by the middle of July, but larvae from late hatched eggs are found up till the end of August or even later. The chief food plant of the insect is the choke cherry but the larvae occasionally feed on other species in the same genus.

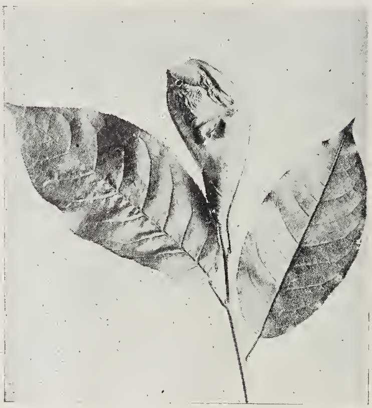


FIG. 3—THE BEGINNING OF THE NEST

Parasites.—Some eight or nine species of parasites have been recorded from the larvae, four of which have been reared in Canada, and these will be considered in the order of their attack.

Apanteles sp. Several specimens of this parasite were found by Mr. J. D. Tothill in British Columbia, having issued from early stage larvae. No further data regarding this species have as yet been secured. The species is non-gregarious and can easily be found in the pupal stage as its small whitish cocoons are attached to the web of the host.

Dichaetoneura leucoptera Johnson is a small tachinid fly, the wings of which are remarkable for being milky colored. The maggots of this fly are found on the host larvae during the first three weeks of July. They are situated in the body cavity just behind the head and are attached by means of integumental funnels through which they breath. The maggots moult twice and become full grown in about three weeks. They then eat their way out through the side of their victim and either pupate in the nest or fall to the ground and pupate under rubbish. The host larvae may live for some time after the parasites have escaped; but none live to reach maturity. The adult flies emerge in from ten to fourteen days. One female fly was kept alive in a cage for over a month which suggests the possibility of their wintering in this condition. In some years as many as forty per cent of the larvae have been parasitized by this species.

Erigorgus prismaticus Nort. is a medium-sized honey-yellow hymenopteron which usually destroys from twenty-five to thirty per cent of the larvae. The eggs are deposited in the body cavity of the host, generally in the neighborhood of the fourth or fifth segment when the larvae are about two-thirds grown. The larvae [illegible] hatching feed a little and grow very slowly until after the host has pupated when they greedily devour the broken down tissues and become [illegible] in a few days. The larvae [illegible] invariably found feeding with [illegible] directed anteriorly in [illegible] when full grown they [illegible] now empty pupal case and pupate in this position.

The adults issue in from a week to ten days and mating takes place soon after. They probably winter as adults since a large number of them were kept alive in breeding cages for over five weeks, without any apparent development of eggs in the females.

Exorista boarmiae Coq. is a tachinid parasite, which, like the foregoing hymenopteron, extends its period of feeding over both the larval and pupal stages of its host. Its maggots also pupate in the empty pupal cases of the tortricid, the contents of which they have devoured, and the adults issue in about two weeks. The parasitism by this species was not more than five per cent in many cases noted.

Predacious insects.—The protection afforded by the web and the habit of living in cells in the nest seems very effective in preventing attack by other insects. Ants were seen in large numbers around and on the nests but they seemed unable to penetrate to the interior and the same is probably true of other predators as well.

Predacious birds.—Birds were very frequently noticed near the nests and no doubt some of the larvae were carried off by them. No nests were found torn open, however, until some of the larvae had pupated and the percentage of larvae destroyed by [illegible] must be relatively small.

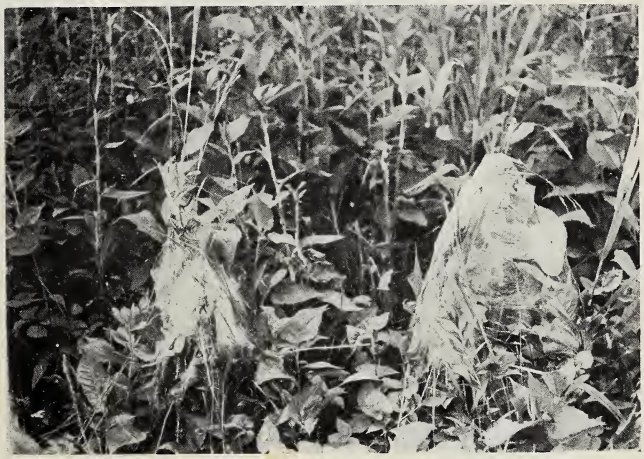


FIG. 4—NESTS SHOWING LARVAE AT WORK ENCLOSING FRESH FOOD MATERIAL

Weather.—While the larvae [illegible] the first instar weather enters into the control to some extent. The young larvae are very tender, and although they are protected by the web and do not seem to be affected by the cold directly, yet [illegible] feed in cold wet weather [illegible] seasons quite a [illegible] are killed by cold and starvation together. Weather may also be considered an indirect factor in that it influences the parasitism by braconids as these work only in fine warm weather.

CONTROL IN THE PUPAL STAGE

When full grown the larvae transform to pupae within their cells in the nest. This stage continues over a period of about ten days and when the adults are nearly ready to emerge the pupæ wriggle out of their cells aided by the spiny scales of the segments of the pupal skin and become attached by the little hooks on the anal end to the outside of the web. The adults usually emerge within a few hours leaving the empty pupal cases still attached, as shown in Fig. 5.

Parasites.—The pupæ are so well protected in the cells within their web that very few are attacked by parasites. *Erigorgus* and *Exorista,* as before mentioned, are in a sense pupal parasites since they emerge from the pupae, but only one true pupal parasite has been reared by me, namely, *Scambus conquisitor* Say. This parasite accounted for less than five per cent of the pupae. The adult is a black hymenopterous fly which parasitizes the pupae of a great many of our common insects.

Predacious birds.—It is very difficult to reduce the part played by birds in the control to a percentage basis. Birds, however, evidently take many more of the pupæ than of the larvae owing probably to the fact that the web becomes withered and more easily penetrated. Their effectiveness is reduced somewhat by the destruction of parasitized pupæ but they are unquestionably important, especially where the insect is not very abundant.

Dead pupae.—For some reason, not yet clear, about twenty-five to thirty per cent of the pupæ become almost fully developed adults and then die before issuing. Such dead pupæ are usually found within the interior of the nest, which often becomes extremely dry. It seems possible that death is due to the drying up of the pupal case to such an extent as to prevent the adult issuing.

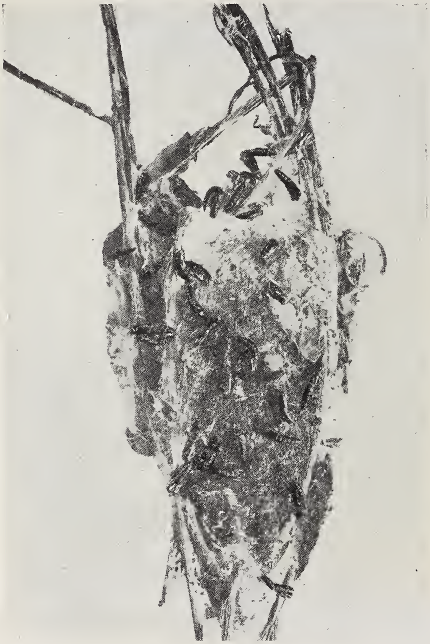


FIG. 5—NEST SHOWING EMPTY PUPAL CASES FROM WHICH ADULTS HAVE EMERGED

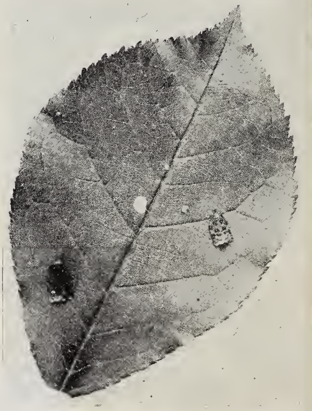


FIG. 6—MALE AND FEMALE MOTHS RESTING ON A CHOKE CHERRY LEAF

THE ADULT STAGE

The moths on emergence do not tend to disperse very far unless carried by high winds. They rest on leaves during the day (Fig 6) and mating usually takes place soon after the females emerge. The length of time in coitu may vary from one to three or more hours. Unmated females may live for two or three weeks but eventually die without depositing any eggs. The mated females usually deposit their eggs within a few hours but a period of several days may elapse if conditions are unfavorable. Each female deposits from one hundred and twenty-five to two hundred eggs, and these may be in one or several masses. Winds may often prove an important factor in control in this stage by blowing large numbers of the adults away from their host plant or from one section of the country to another.

SUMMARY

Taking the average progeny of a pair of moths as one hundred and fifty, the following table shows approximately the percentage in numbers destroyed, by the several known factors mentioned in the foregoing notes, in New Brunswick, where most of the observations have been made:

**T. tortricis*	.5	1	149
*Egg predators	77	115	34
D. leucoptera	40	14	20
E. prismaticus	30	6	14
E. boarmiae	2	2	12
S. conquisitor	2	2	10
Dead pupæ	30	3	7
Birds	?	?	?
Weather	?	?	?

*These factors may sometimes be reversed.

From this table it may be seen that the control brought about by insect parasites and other factors which can be reduced to a percentage allows a total of seven, or more than three pairs of moths, to reach maturity from the progeny of one pair. In order to keep the insect at par, and it is usually held more or less at par, over periods of any length only one pair can reach maturity and deposit eggs for the next generation, so that further control must be attributed to adverse weather conditions and to the work of birds throughout the season.

THE SEED BRANCH

AMPLE SEED CORN FOR 1918 PLANTING

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

UNDER the system outlined in the April number of The Agricultural Gazette, p. 351, an abundant supply of seed corn was secured for Canada's requirements. From March 22nd until April 25th, the Canadian Government Seed Purchasing Commission maintained a representative in Washington to expedite the securing of export licenses for Canadian orders of both field and sweet corn. During the first part of the season the arrangements made in February with the Seed Stocks Committee of the U.S. Department of Agriculture and the U.S War Trade Board, were adhered to, and export licenses were granted only for the later varieties of corn grown in or south of the states of Kansas, Missouri, Tennessee, and Virginia. Later in the season, when the distribution of seed corn in the United States was well advanced, applications for export licenses covering early varieties that were then available were considered. On April 12th approval was secured for the exportation of 10,000 bushels of corn grown in the State of Delaware. This corn, which was an exceptionally early Yellow Dent type of a flinty nature, was ordered for a private concern for the production of matured grain in Essex County, but later was taken over by the Seed Purchasing Commission and distributed mostly in Essex and Kent counties.

On April 20th announcement was made to the Seed Trade Committee that the U.S War Trade Board would consider applications for export licenses for such early varieties as were available, and licenses would be granted unless the shipments were from districts where the corn was especially needed. Under this arrangement, Canadian dealers were able to obtain limited quantities of Early Dent and Flint varieties. The Seed Purchasing Commission secured 3,000 bushels of White Cap Yellow Dent grown in New Jersey and northern Maryland, which was offered to the trade at cost. This, with the Delaware corn, made a total of about 13,000 bushels of early maturing corn purchased directly by the Commission.

Orders for field corn were placed by the Commission for Canadian dealers amounting to a total of about 334,000 bushels, which, with the direct purchases of the Commission, made a total of about 347,000 bushels ordered. Of this amount, orders for about 22,000 bushels were cancelled. In addition to the above, a few thousand bushels were imported in lots of 100 bushels or less, for which the Commission order was not required.

Owing to the threatened scarcity of seed corn, retail dealers and farmers placed their orders early, and apparently in many cases duplicated them and afterwards cancelled many orders when their actual requirements were filled. This, together with the reduced acreage planted to corn on account of labour scarcity, caused the wholesale dealers to overestimate the demand, and in some cases to place orders in excess of their requirements, with the result, that instead of the threatened shortage of seed corn materializing, there was an abundant supply, and considerable quantities are being carried over or disposed of for feed or milling.

The shortage of good sweet corn seed was even more pronounced than with field corn, and great difficulty was experienced by Canadian dealers in securing seed of strong vitality. Early in the season, export licenses were approved covering the estimated requirements of the Canadian canning factories and wholesale seedsmen. Owing in part to the low germination of the corn delivered, these orders were later very much increased, and others were placed which had not been included in the list originally submitted and approved for export. The applications were very much in excess of estimates, but export licenses were granted for all orders.

MAKING WEED SEED COLLECTIONS—SUGGESTIONS FOR TEACHERS OF RURAL SCIENCE

BY JOHN R. DYMOND, B.A., SEED ANALYST

THE purpose of this article is to list the weed seeds to which attention should be directed in making collections in schools.

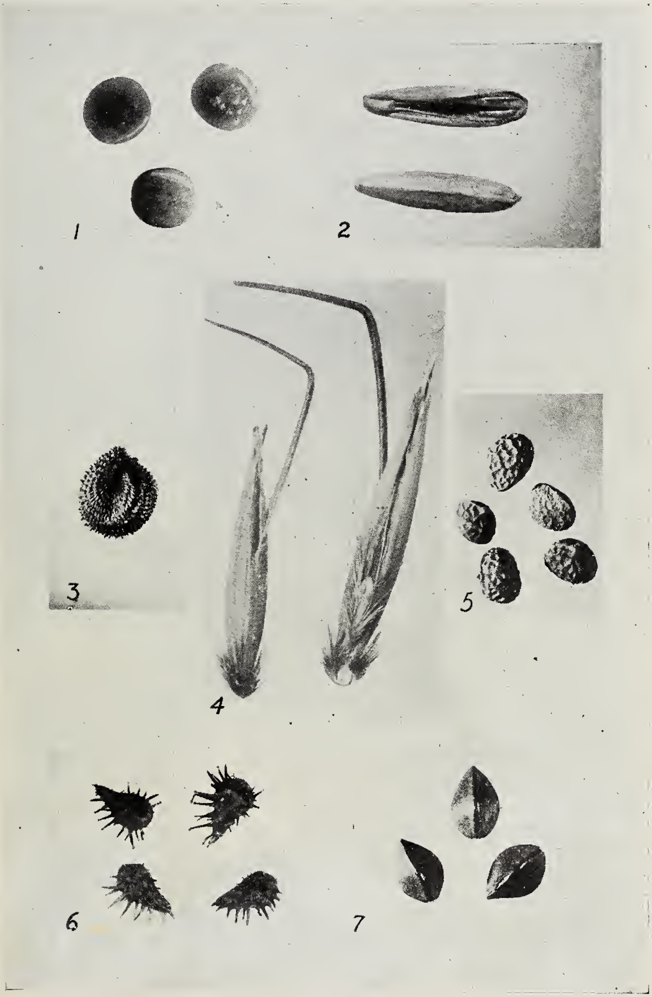
IMPORTANCE OF SEED STUDIES

No subject in agriculture is better adapted for presentation to school children than the study of seeds. The collection, identification, and study of seeds give scope for the training of a wide range of faculties, and the intrinsic value of the information so derived is of real value to anyone engaged in crop production. It is, therefore, advisable that those responsible for directing children in collecting and studying seeds should understand the seeds it is most important to know, and their relationship to the different branches of crop production.

DISTRIBUTION OF WEEDS

Unfortunately, it is not difficult to make a fairly large and representative collection of weed seeds in almost any district in Canada.

There are a number of weeds which occur practically everywhere. On the other hand, a great many are associated with certain crops, or with certain types of soil, or are limited to particular sections of the country. The weed seeds which may be found in almost any district include lamb's quarters (*Chenopodium album L.*), wild buckwheat



Photos by H. B. Sifton

EXPLANATION OF PLATE.

1—Wild vetch (Vicia angustifolia (L) Reichard) X5.
2—Chess (Bromus secalinus L.). X5.
3—Purple cockle (Agrostemma Githago L.) X5.
4—Wild oats (Avena fatua L.) X5.
5—Ball mustard (Neslia paniculata (L) Desv.) X5.
6—Stickseed (Lappula echinata Gilibert).
7—Wild buckwheat (Polygonum Convolvulus L.) X5.

(*Polygonum Convolvulus L.*), wild oats (*Avena fatua L.*), and wild mustard (*Brassica arvensis* (L.) Ktze).

WEED SEED IMPURITIES OF GRAIN

The following list includes the most characteristic impurities of grain grown in different parts of the country. It should be possible to secure all of the seeds here listed in any school section in the province or district indicated. It will be noticed that most of these weeds are annuals:

*Wild buckwheat.
*Lamb's quarters
*Wild mustard
Wild oats—very common except in Prince Edward Island
†Ball mustard (Neslia paniculata (L) Desv)
†Stickseed (Lappula echinata Gilibert)
†Western false flax (Camelina sativa (L) Crantz).
†Hare's-ear mustard (Conringia orientalis (L) Dumort).
†Stinkweed (Thlaspi arvense L.)
†Cow cockle (Saponaria Vaccaria L.)
†Tumbling mustard (Sisymbrium altissimum L.).
Purple cockle (Agrostemma Githago L.)—Very common especially in wheat.
Perennial sow thistle (Sonchus arvensis L.)—One of the worst weeds. Its seeds are found to some extent in grain from Eastern Canada and Southern Manitoba.
Lady's thumb (Polygonum Persicaria L.) One of the commonest impurities of grain except on the prairies.
Spurrey (Spergula arvensis L.)—Characteristic of grain from the Maritime Provinces, Quebec, and British Columbia.
Hemp nettle (Galeopsis Tetrahit L.)—Especially common in Prince Edward Island, Nova Scotia, and Quebec.
Wild vetch (Vicia angustifolia (L) Reichard)—A very common impurity of grain in Ontario and Quebec.
Chess (Bromus secalinus L.)—Very common in Ontario fall wheat.
Darnel (Lolium temulentum L.)—Occurs commonly in Red River Valley and occasionally throughout the Prairie Provinces.
Great Ragweed (Ambrosia trifida L.)—Wheat from some districts of the West often contains considerable quantities of these seeds.
Chicory (Cichorium Intybus L.)—Frequently found in Quebec seed.
Worm-seed mustard (Erysimum cheiranthoides L.)—A very bitter seed that renders chopped feed made from grain containing it very unpalatable to some kinds of stock, especially hogs. Often found in grain and sometimes in timothy seed.

CHARACTERISTIC IMPURITIES OF GRASS AND CLOVER SEEDS

Red clover, alsike, alfalfa, timothy, western rye grass, awnless brome grass, and blue grass are grown for seed in one or more of the provinces. The enforcement of the Seed Control Act has made it unprofitable to grow low grade or rejected seed. On the other hand, the demand for No. 1 seed is greater than the supply, and consequently the production of pure seed is very profitable. Hence the importance of making farmers acquainted with the weeds whose seeds lower the grade of their seed, especially in districts where grass and clover seed production is being attempted. The most objectionable weeds in seed production are those the seeds of which are so near the size of the seed in which they occur, that they cannot be removed by ordinary cleaning machinery. Canada imports considerable red clover, timothy and alfalfa seed. There are two good reasons why we should produce as much as possible of these seeds at home. First, home-grown seeds produce better crops under our conditions than imported seed, especially of southern origin, and, second, for economic reasons we need to buy as little as possible abroad and export all we can. From the standpoint of maintaining soil fertility, there is no more important crop than red clover in those parts of Canada where it can be successfully grown, and it is most important that farmers in those districts be given every possible information on clover seed production. The preparation of a collection of weed seeds objectionable in red clover, timothy, alfalfa, or whatever seed crop the district is fitted for growing, should be an interesting and valuable piece of work. The following list includes only the most prevalent impurities of seed from the districts indicated:

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*Common impurities of grain everywhere.

†Prevalent on the prairies, and not infrequently found in other parts, especially where low-grade Western grain has been used as seed or fed without being first cleaned and ground.

Ribgrass or Buckhorn (Plantago lanceolata L.) one of the most frequent and injurious impurities of Canadian-grown grass and clover seed; especially common in red clover; difficult to remove by ordinary cleaning machinery.

Green foxtail (Setaria viridis (L) Beauv), very common in red clover seed and difficult to remove.

Night-flowering catchfly (Silene noctiflora L.), the commonest impurity of alsike, found also in timothy and red clover.

‡Docks (Rumex species).
‡Canada thistle (Cirsium arvense (L) Scop.)
‡Sheep sorrel (Rumex acetosella L.)
‡Black medick (Medicago lupulina L.)
‡Pale plantain (Plantago Rugelii Dcne.)
‡Common plantain (Plantago major L.)
‡Lamb's quarters.

Cinquefoil (Potentilla monspeliensis L.), the commonest impurity of timothy seed.

Chickweed (Stellaria media (L.) Cyrill), *stitchwort* (Stellaria graminea L.) and *mouse-ear chickweed* (Cerastium vulgatum L.) occur commonly in timothy and less frequently in alsike.

Peppergrass (Lepidium apetalum Willd) common in timothy.

Ox-eye daisy (Chrysanthemum Leucanthemum L.), frequently found in Quebec timothy, and not uncommon in Ontario and Prince Edward Island timothy.

Chicory (Cichorium Intybus L.), found in Quebec red clover.

Northern gentian (Gentiana Amarella L. var. acuta (Michx) Herder) and *blue-eyed grass* (Sisyrinchium angustifolium Mill), frequently found in Alberta timothy seed.

IDENTIFICATION OF WEED SEEDS

The book "Farm Weeds of Canada," which was distributed by the Seed Branch to the schools a number of years ago, is one of the best publications obtainable for use in the study of weeds. The book is at present out of print. Bulletin S-8 on "Weeds and Weed Seeds" contains illustrations in black and white, and much of the essential information contained in "Farm Weeds." Copies of this bulletin may be had free on application to the Publications Branch, Department of Agriculture, Ottawa. Seeds may be sent for identification to the Seed Commissioner. Department of Agriculture, Ottawa. When so addressed, parcels will come free if not more than 12 ounces in weight. Glass bottles should not be used unless they are well packed in strong boxes. Two or more sorts should be designated by a letter or figure.

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‡Very frequently found in red clover, alsike and timothy seed, especially in the East.

THE FRUIT BRANCH

THE 1918 APPLE CROP

BY F. A. GRINDLEY, B.S.A., ASSISTANT TO THE FRUIT COMMISSIONER

A SUMMARY of the present apple prospects in Canada, and a comparison with the crop of 1917, shows a close similarity between the two, as far as the total yield and its ultimate distribution are concerned. So obvious is the similarity that this article would hardly be complete and comprehensive unless preceded by a review of the general situation last year, and a resumé of the difficulties which had to be met in 1917 in order to successfully distribute the crop.

At that time Nova Scotia was confronted for the first time with the problems attendant upon the British embargo. Fortunately, the Ontario apple crop in 1917 was unusually light, and it was quite apparent, early in the season, that many markets in Canada, ordinarily dependent upon Ontario for their supply, would have to receive their quota from Nova Scotia and British Columbia.

The situation presented many difficulties. Early in August fruit shippers in the Annapolis Valley were making plans to widen their home markets, and it was obvious that, if their crop was to be saved, it would be necessary to move a large proportion of it into Western Canada. At the same time consideration had to be given to the fact that British Columbia would have to market practically her entire exportable surplus in the Prairie Provinces. Care had to be taken that these markets were not over-supplied, and that sufficient fruit reached Toronto, Montreal, and similar markets in the middle east.

TRANSPORTATION DIFFICULTIES

Then there arose the difficulty of adequate transportation facilities, which was forcibly presented to all who were concerned with fruit marketing. There were so many demands being made upon the railway companies that it was doubtful whether the available equipment could meet them. Little or no definite encouragement was offered.

All these problems were the result of a new condition of things. Nova Scotia had always depended upon the British markets to consume the bulk of her crop, and had seldom been obliged to look elsewhere for sales. Then came an embargo shutting off exports. The panic which immediately followed can be readily imagined. Petitions were made to the Government; deputations came post haste to Ottawa; growers saw blue ruin in front of them.

But there was a shortage of apples in Ontario. Far-seeing buyers and speculators were soon in the Annapolis Valley making purchases while the fruit was still on the trees. A new situation presented itself and the Nova Scotia growers were not slow to appreciate it. Instead of the early panic, which had been emphasized by a willingness to sell at very low figures, there was now a rapid advance in prices.

THE DIFFICULTIES OVERCOME

It was at this stage of development that the Fruit Branch, working in co-operation with the Canada Food Board, stepped into the ring. Immediate action was imperative. Unfortunately, prices had already advanced to a high figure, and all that could be done was to make every possible provision for the marketing of the crop, and the prevention of waste. A representative was at once stationed in the Annapolis Valley in order to supervise the distribution and loading of cars. Transportation facilities rapidly improved, and ultimately became so adequate that none of the crop failed to find a market. Too much credit cannot be given to the railway companies for the splendid manner in which they responded to an urgent appeal, and for the continued efforts they put forth to meet an unprecedented situation. During the season of 1917, over two thousand carloads of Nova Scotia apples moved westward. Of these, 600 cars were marketed in the province of Quebec, 950 cars in Ontario, and 350 cars west of the great lakes. At the same time that this westward movement was taking place, assistance was also being given to the shippers of British Columbia, where, too, the pinch of unsatisfactory railway equipment had been felt.

THE SEASON OF 1918

And now we come to the season of 1918. The total available supply of apples in Canada will probably be appreciably less than a year ago. Nova Scotia will produce approximately 400,000 barrels of apples, according to present estimates, which is only 60 per cent of last year's crop of 700,000 barrels. Ontario expects a slight increase over last year's production and British Columbia a slight decrease. Quebec will have an exceptionally light crop, particularly of fall and winter apples.

The British embargo on Canadian apples is still in effect, and there is practically no likelihood of its removal or modification this year. It will, therefore, be necessary for the Nova Scotia crop to move westward. We may take it for granted, though, that the experience of 1917 will serve as a guide and be of the greatest possible benefit to individual shippers and to distributing agents this year. The efforts which are now being made to encourage the consumption of fresh fruits and vegetables will ensure a steady demand; in fact, the demand will very likely be greater than the supply. No marketing difficulties are, therefore, to be expected.

So far as prices are concerned, it would be unwise to make any definite statement at this date. According to the law of supply and demand, prices should rule high. But we have learned, since the outbreak of the war, not to anticipate results with the same certainty as formerly. If past experience teaches anything, some effort should be made to prevent the unwarranted advance in prices which characterized the commercial apple market a year ago. If that is done, prices need not be any higher than the comparatively light crop would justify.

THE DETENTION OF CARS

In connection with the shipments during the present season a circular has been sent out warning against car detention and relating to other matters appertaining to the transportation services. The warning requires that the Food Controller shall be notified by the railway companies of any freight car containing food or food products that remains under load for a longer period than four days after notice of its arrival, or more than one day for furtherance order. To facilitate a prompt delivery, and to ensure fairness to both consignee and shipper, and to avoid unnecessary waste, the Fruit Commissioner, upon request from either shipper or consignee, will have inspection of such cars made by a Dominion Government inspector, and a copy of his report stating the exact condition of the goods, their containers, and of the cars will be forwarded to the applicant. The inspection service referred to is free, but at present can only be supplied at the larger market centres, such as London, Toronto, Hamilton, Ottawa, Montreal, Quebec, St. John, N.B., Halifax, N.S., Winnipeg, Calgary, and Vancouver.

Every shipper and consignee handling carload shipments is advised to get a copy of the interswitching of freight traffic order which became effective August 1st, 1918.

The consolidated school offers a medium of organization that can not be found otherwise. The value of the county agricultural agent is increased over and over again, through the organization made possible by these schools. For example, every boy and girl studying agriculture has performed the experiment of treating oats for smut and in this way 100 per cent of farmers have treated oats who otherwise would not have done so. The schools have tested hundreds of bushels of seed corn, having at least one ear from each farm from the county, unless that particular farmer was testing his corn for himself. . . . . As a direct result of the teaching of agriculture, agricultural clubs of all kinds are organized and the work pushed through the medium of the school.—*The Banker-Farmer.*

PART II

Provincial Departments of Agriculture

RURAL CREDITS

In recent years a deal of attention has been paid to the subject of "Rural Credits", or the matter of increasing the financial facilities of the agricultural community and of settlers. A number of Acts have been passed by the different provincial legislatures with this object in view, the majority of which have been referred to, or reviewed, in the year of their adoption, in The Agricultural Gazette. Last year was particularly prolific in the passing of such measures. Although, of course, the most recent of these have hardly had time to be tried out, the majority have been put into force with substantial success. In order that each province might know the progress that is being made, the following series of articles have been brought together:

NOVA SCOTIA

BY W. B. McCOY, SECRETARY, INDUSTRIES AND IMMIGRATION

THE Legislature of Nova Scotia in 1912 passed an Act for the Encouragement of Settlement on Farm Lands with the object of affording means whereby settlers would be encouraged to purchase or acquire for themselves farm holdings. While this legislation was intended primarily to serve the interests of agricultural new-comers, the benefits of the measure have been available to native farmers of the province as well who wish to buy land or effect any economic improvement of their farms.

Under the terms of this Act, the money is not granted directly to the applicant by the Government. Arrangements have been made with an established loan company whereby the money is advanced by that corporation, the Government guaranteeing a certain proportion of the loan. When the loan company will agree to advance to a farmer forty per cent of the appraised value of the property he wishes to purchase or improve, the Government will, in approved cases, and to thoroughly experienced farmers, guarantee, if necessary, an advance of forty per cent additional, making eighty per cent in all advanced by the company. The applicant must possess cash to the value of at least twenty per cent of the appraised value of the farm, in addition to what he would require for house furnishing, for stock, implements, and for the maintenance of himself and family. A mortgage is taken by the loan company on the property.

HOW A LOAN MAY BE OBTAINED

A farmer who wishes to obtain assistance under this Act applies for a loan through the Department of Industries and Immigration. His property, or the property he wishes to purchase, is then inspected and a value placed upon it by the Farm Inspector of the Department. The farm is also inspected and valued by the land valuer of the loan company.

Farms on which loans are granted are inspected from time to time by the Inspector of the Department, who is empowered to issue instructions for the guidance of the borrower. The mortgagee must farm, cultivate, manure, and manage the farm in a husbandlike manner, and follow such methods of husbandry as will keep the land in good heart. He must repair and keep in repair all the buildings, fences, hedges, and walls on the place, and must not allow any noxious weeds to run to seed. He must keep his farm well and properly stocked, and, so far as is practicable, must consume with stock on the farm all hay, grain, and root crops grown on the farm. In the event of selling any of these products off the place, he must return to the land either barnyard manure or commercial fertilizer of a value equal to two-thirds of the manurial value of the products sold.

REPAYMENT SYSTEM

By the system of repayments adopted the mortgagee makes repayments by the amortization method. It is generally held that the amortization plan of paying off principal and interest by half yearly or yearly instalments is more favorable to the borrower in the long run than a straight interest mortgage. It not only makes him save, and thereby encourages thrift, but the actual total cost at the end of the instalment mortgage is considerably less. The mortgages negotiated by the Department of Industries and Immigration are for a definite number of years agreed upon, but the borrower has the privilege of paying off at any time during that period. On the other hand the company cannot call in the mortgage until the end of the term, provided, of course, the borrower pays his instalments with a reasonable degree of promptness. It may be difficult for a newcomer during the first years of his incumbency of the farm to pay much on principal account. This is taken into consideration, and, in order to assist the farmer to get well established, the Government and loan company may agree to a release of payments for a period not exceeding five years. The amortization plan will then immediately come into operation, and the payments thereafter will continue to reduce the mortgage debt.

THE LOANS GRANTED

Altogether up to date there have been 187 applications for assistance. Of these applications 70 have been granted. For the loans granted, mortgages have been taken by the loan company on buildings valued at $94,850, and on 11,079 acres of land valued at $121,658. The total loans granted amounted to $129,765, of which amount the Government guaranteed $56,825. The total valuation of the property given as security was $216,508. The other applications were declined for various reasons, among which were defective title, insufficient security, and unfitness of the applicant. The terms of the mortgages taken ranged from six to fifteen years, with interest at from six to seven per cent, according to the condition of the money market. The purposes for which loans were granted included, not only the purchase of land, but also such improvements as underdrainage, the clearing of additional land, the purchase of stock and implements, and the erection of suitable fencing and outbuildings.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

THE yearly decrease in the rural population, the large number of abandoned or semi-abandoned farms, the steady increase of importation of foodstuffs, and the insistent call for capital by men who were willing to till the soil, induced the Government to pass "An Act to Encourage the Settlement of Farm Lands." Under this Act provision is made for a bond issue, and for the appointment of a board of three to administer the fund, select farms to purchase and resell the same to *bona fide* settlers. The board is a body politic and corporate, and all the transactions are made in the name of the board.

A bond issue of $100,000 was made under the Provincial Loans Act, to run for a period of twenty years; $5,000 is set aside yearly from the current revenues to meet the principal when it falls due. A later issue of $50,000 has also been made.

Farms can be purchased by the board and resold at cost upon the following terms:—

> Twenty-five per centum of the purchase money, if the price being paid for the property is less than one thousand dollars, but, if in excess of that sum, then an initial payment of thirty-five per cent, to be paid when possession is given to the purchaser, and the balance, with interest at five per cent thereon, at such stated periods as the said board may agree upon with the purchaser; the final payment to be made at a date not exceeding ten years from the date of the agreement to purchase, except that in special cases an extension of two years may be given by unanimous consent of the board.

PROCEDURE TO OBTAIN A FARM

The difficulties of sale, arising at the first purchasing of vacant farms, generally because of location, forced the board to adopt the present system. Now, suitable farms for settlement with every obtainable detail are listed, and any one without choice as to location is rendered assistance in proper selection. Immediately a settler decides upon a property the Inspector, who is a member of the board, makes a careful inspection of the property and reports to the board with a recommendation as to value, etc. If satisfactory, the property is purchased by the board and resold to the settler upon the terms laid down in the Act. The board continues to hold the deed, and the purchaser holds an agreement from the board until the indebtedness incurred in the obtaining of credit is paid by means of yearly instalments, and then a transfer of the property is made.

Many young men within the province are desirous of securing properties near relatives; in such cases the applicant chooses the nearest vacant farm suitable for his purposes, and makes an application for assistance to the board. The regular procedure is followed, and in nearly every case such men are assisted. Were it not for this assistance large numbers of these young men would move to other parts.

PROTECTION TO SETTLERS

Incoming settlers who deal with the board are protected against the purchase of homes in out-of-the-way places. Many districts which at one time had a goodly number of settlers have been vacated, due to unsuitability for agriculture, or to the lack of transportation, discontinued because of cessation of industry incident to lumbering or mining. The urgent need for food materials induced many to clear and cultivate land near such points. Speculation in land is also eliminated. The early settlers naturally cleared much high and very rolling land which should have remained under timber—such farms should remain vacant and be reforested..

CASES OF DEFAULT

Should any purchaser default in the payments agreed upon, the board is at liberty to dispossess and arrange for another settler. However, in such cases, if unfavourable circumstances have caused the inability to pay, every consideration and assistance is given in order not to discourage. If, however, wilful neglect or endeavour to defraud appear to be the cause of default, the farm is immediately taken by the board.

The Act was passed in 1912. Up to date, 345 farms have been purchased; 333 have been resold for $275,644, which also represents the purchase price. The purchasers have repaid by instalments $130,600.74. In practically every case the loan assists in the purchase of the land.

QUEBEC

BY G. E. MARQUIS, CHIEF OF THE STATISTICS OFFICE

ALTHOUGH there are as yet, properly speaking, no rural credit associations in the province of Quebec similar to the western associations, there are a large number of "Caisses Populaires" (credit banks) constituting real institutions of savings and credit, open to the agricultural and manufacturing classes.

Such banks were organized under the Quebec Syndicates Act, 1906, (Revised Statutes, Quebec, 1909, amended by 1 Geo. V., 2nd session and 5 Geo. V.).

The object of the association is defined as follows by the statute:—

> *R.S.Q. 1909, Art. 6767.* The object of the association shall be to study, protect, and defend the economic interests of the labouring classes. For that purpose it may buy for re-sale to the associates only, such articles as are necessary for the support of life, or for the works of their industry; open up credits for them and make loans to them; establish works in common for the associates, or allow them to devote themselves to processes of production, and to sell the products thereof, either collectively or individually. 6 Ed. VII., c. 33, s.5,

No one but the members can do business with the association. The shares must not be less than a dollar each; usually, they are $5. There is a limit to the number of shares that may be purchased by a shareholder, but this number is considerable.

Not a cent is contributed to the funds of these banks by any municipal council or by the Government.

METHOD OF OPERATION

The loans are made on the security of first mortgage, when the amount is considerable, or on promissory notes, when the amount borrowed is comparatively small. Refunds are made monthly—capital and interest.

Profits are divided between the shareholders in the shape of dividends at the end of the association year, after previously deducting at least ten per cent of the total amount of profits to make a collective credit amount for covering possible losses. The dividend paid to the shareholders varies between 3½ to 7 per cent of the capital they have subscribed; the interest paid to the depositors varies between 3 and 4 per cent of their savings.

THE SAFEGUARD

Since 1915, these banks have been under the obligation to prepare a statement in triplicate of their operations at the end of the fiscal year; a copy of this statement is handed to the secretary of the province, another one to the office of the clerk, or of the secretary-treasurer of the municipality, and the third one is kept in the office of the association. The correctness of such a statement is certified under oath by the manager before a justice of the peace. This is the only supervision—if it is one—exercised by the Government of the province.

The Quebec Statistical Year Book contains in its last volume (1917) a special chapter filled with elaborate statistics on credit banks. This chapter is divided into two parts, one being a retrospective and summary account of the operations of all banks, and the other one a complete financial statement for 1916.

The following information is taken from this volume for the year 1916:—

Number of banks reporting......	94
Number of members.............	25,028
Number of depositors...........	15,613
Number of borrowers...........	6,696
Number of loans agreed to	11,200
Amount of loans made........	$1,641,258
Total profits accumulated.....	$100,945

The operations of the banks in 1916 amounted to $5,534,246.44, divided as follows as receipts and expenditures:—

Receipts:

Cash on hand, first day of the year.........	$ 326,176.09
Social capital..........	118,195.56
Admission taxes........	3,088.68
Savings...............	3,543,462.76
Loans postponed.......	1,423,445.01
Profits...............	119,878.34
Total.............	$5,534,246.44

Expenditures:

*Share capital paid up..	$ 61,733.40
Savings refunded.......	3,142,982.14
Loans outstanding......	1,771,247.38
General expenditure....	16,230.06
Dividends.............	31,562.50
Interest on savings.....	32,026.50
Cash on hand the last day................	478,464.46
Total............	$5,534,246.44

*Six Caisses Populaire did not report.

The previous year the transactions of the banks amounted to $4,490,953.41. This is an increase of $1,043,293.03 for 1916, which is conclusive evidence of the development and the usefulness of these financial institutions.

POPULARITY OF THE SYSTEM

Mutuality is one of the main characteristics of the organization. The "Caisses Populaires" are a social rather than a financial institution. This fact, which has been particularly emphazised by their founder, Mr. Alphonse Desjardins, of Levis, in the many lectures that he gave on the subject, is what makes these credit banks so popular among the labouring classes of the cities and of the country.

The truth of the above statement is clearly shown in a table given in the Quebec Statistical Year Book. Out of 11,201 loans made during the year 1916, for amounts, most of which were under $1,000, the loans of $100 to $200 have been the most numerous. There have been, for instance, 579 loans of $5 to $10; 725 loans of $20 to $25; 875 loans of $40 to $50; 1,620 loans of $100 to $200; 118 loans of $500 to $600; and finally 85 loans of $900 to $1000.

If the total sum loaned in 1916 is divided by the number of loans, it is found that the average is $146.53 per loan.

Out of the 100 banks existing in 1916, 19 were found in the cities—of which 4 were in Montreal and 5 in Quebec— and 81 in the towns. A few others have been established in 1917.

To sum up, the system of the credit banks, after being thoroughly tested for several years, has now gained the confidence of the public, especially of the small wage-earners, who may not have any property, and whose credit is measured by their moral value. And this confidence will yet grow stronger, and exercise an effect more and more beneficial on the public mind by encouraging our people to save, and by creating reserves of capital for the needs of less fortunate classes, who may call upon these reserves in their hour of need in proportion to their frugality, their honesty, and their activity.

ONTARIO

AT the 1916 session of the provincial legislature, an Act was passed authorizing the making of loans to settlers in the Northern and North-western districts of Ontario.

The maximum amount of any loan to be made to a settler was placed at $500, with interest at the rate of six per cent per annum, upon such terms and conditions as the Loan Commissioner might think proper.

Any loan made is registered against the land; in the case of unpatented lands, in the Department of Lands, Forest, and Mines; and, in the case of patented lands, in the property Registry or Land Titles Office, and constitutes a lien against the land.

Settlers desiring to secure a loan are required to call upon the Crown Lands Agent for the district in which they are located, where an application form can be filled out giving details as to location of lot, the amount of loan required, the period of years over which it is desired to have the loan, and the proposed terms of repayment; the interest being paid annually. Full information must be given as to the purpose for which the loan is required, as the intention of the Government in providing a loan is to assist the legitimate settler in making further improvements in the way of erecting buildings, purchase of live stock and farm implements, the clearing of the land, etc., and one of the conditions governing the disbursement of any loans advanced, is that the money must be expended for the specific purpose set out in the application, except the consent of the Loan Commissioner in writing has been first obtained, covering any change in the proposed expenditure.

In addition, the application form provides for detailed information regarding the number of acres of land cultivated, number of acres ready for cultivation, number of acres chopped or burnt, total number of acres of arable land, number of acres of standing timber, class or kind of timber, and as to the dimensions and material of buildings on the lot, and also as to the amount of live stock and farm implements on hand.

Under the arrangements as above outlined, the total of the sums advanced up to the year ending October 31, 1917, reached $300,000, the number of loans made was 1,167, and the average of each was $257. The applications for loans ranged in amount from $50 to $500.

THE FARM LOAN ACT

In 1917 the Farm Loan Act reviewed in THE AGRICULTURAL GAZETTE, Vol. IV., page 484, was passed. This measure authorizes the provincial Treasurer to loan money to the township corporation against debentures of the township, to enable the corporation to make loans to farmers, principally for permanent improvement.

MANITOBA

IN Volume IV of THE AGRICULTURAL GAZETTE, page 489, is given a brief summary of the Rural Credits Act, passed by the Manitoba legislature at the session of 1917. As the Act came into force at once, it is possible to give some account of the success achieved in the first year of its operation.

As previously stated in THE GAZETTE, the Act provides for the organization by Manitoba farmers of Rural Credit Societies, through which the individual shareholders of such societies may be enabled to secure short-term loans for carrying on or extending their farming operations. The security for the loan granted will be the crops produced by the use of the money loaned, the live stock, or machinery purchased therewith. The money is loaned by the bank to the societies at 6 per cent, and the individual borrower is charged 7 per cent, the difference going to pay the expenses of the society and to augment the guarantee fund.

METHOD OF CAPITALIZATION

Each member of the society is required to take stock to the amount of $100, and his liability is limited to that amount. The provincial Government takes stock to an amount equal to half that subscribed by the members of the society, and the municipality within the boundaries of which the members of the society live, and carry on their farming operations, takes stock to the same amount as the Government. The proceeds of this stock form a guarantee fund as the basis for credit, and the society will be enabled to secure credits for individual members to a total of many times the amount of the subscribed stock. It is provided that the municipal subscription need not be in actual cash, but may be in bonds of the municipality. With a capital of $10,000 accruing from the subscriptions of fifty farmers at $100 each, and from the municipality and the provincial Government each subscribing half as much, and the society becoming responsible for each loan made to its members, it is figured that loans to a total of at least $100,000 could be secured from the bank, or banks, with which it is arranged the society shall do business.

PROCESS OF ORGANIZATION

The Act provides that when at least fifteen farmers in any district have decided to organize a Rural Credit Society, they shall make application by petition to the provincial secretary for permission to be incorporated. The Government then appoints an officer to act as secretary and treasurer of the society until the organization of the society has been completed and a permanent secretary and treasurer appointed. No society can commence business until it has received subscriptions from not less than 50 persons actually engaged in farming, or who have agreed to engage within one year in farming operations, and these must subscribe for stock to the amount of not less than $5,000, of which not less than 10 per cent must have been paid up. When the organization of the society is complete the management is vested in a board of nine directors, three being elected by the members of the society, three named by the municipality, and three appointed by the Government of Manitoba. The last-named must include a graduate in agriculture, who becomes Government supervisor of agriculture in the district. One of the directors is to act as secretary and must be a capable accountant. He will be the only officer paid by the society. The Act provides that the loans shall be for the purchase of seed, feed, or other supplies; the purchase of implements and machinery; the purchase of live stock; the payment of the cost of carrying on farming, ranching, dairying, or other like operations, and the payment of the cost of preparing land for cultivation.

PROMOTION OF CO-OPERATION

The Credit Society is also given permission to act as agent for the members in purchasing supplies and selling products, and may take steps to promote co-operation for the improvement of conditions of farm life, and to extend the application of the society's activities to all residents of the district. Notes covering loans will mature not later than December 31st of the year in which the loans are made. If the loans cannot reasonably be realized by that date, they may be renewed. The security will be the property purchased, together with the offspring of live stock, and the crops or other products grown upon the lands for the working of which the loan is secured.

The directors of the society will be responsible for passing upon applications for grants. The Act provides that all municipal, provincial, or school buildings may be used by any society for any meeting free of charge.

THE FIRST YEAR'S PROGRESS

At the present time there are seventeen societies chartered with an organized capital of $20,000 each. As indicating the progress that is being made under the Act, the following particulars of transactions carried on by two of the societies may be mentioned:

The Roblin Rural Credit Society with headquarters at Roblin in the municipality of Shell River, has granted 49 credits, totalling $33,297, to date. Loans are for the following purposes:—

Implements and machinery..	$2,460.00
Putting in and taking off crop..................	10,021.00
Seed grain.................	4,621.00
Stock.....................	5,655.00
New breaking..............	6,615.00
Feed for Stock.............	790.00
Improvements to farm......	3,105.00
Total.................	$33,267.00

The Lawrence Rural Credit Society, in the rural municipality of Lawrence, with headquarters at Freedale, a municipality without a railroad, has passed 52 loans, totalling $12,670, for the following purposes:—

Machinery.................	$3,175.00
Live stock.................	2,790.00
New breaking..............	4,615.00
Putting in and taking off crop	2,090.00
Total..................	$12,670.00

ALBERTA

BY J. McCAIG, M.A., EDITOR OF PUBLICATIONS

We have three Acts passed in 1917 that are devoted to the securing of funds for agricultural purposes. The first of these is called "An Act to encourage the increased raising of stock in the province of Alberta," commonly called "The Cow Bill." This Act is administered under the Live Stock Commissioner's office. It provides for the establishing of co-operative borrowing associations of farmers to the number of five up, who may borrow to the limit of $500 each for the purchase of stock, subject to the approval of the commissioner as to the amount borrowed and the stock purchased.

The stock must consist of cows and heifers, but provision is made for the joint purchase of registered bulls. A dollar fee is collected from each member for every $100 borrowed. The interest must not exceed 6 per cent. The money is secured from the banks, and repayment guaranteed by the Government. The sale of stock and offspring is subject to the approval of the commissioner. No female stock can be sold. The loan covers a period of five years, but may be paid before that time. The Government guaranteed over half a million dollars to twelve hundred borrowers under this Act in the year 1917.

The second Act is called "An Act respecting co-operative credit." It authorizes the formation of co-operative credit societies which shall loan money on joint municipal and Government guarantee to borrowers. The credit association is organized after the manner of stock companies. It has eight directors, four named by the organization meeting, two named by the Lieutenant-Governor in council, and two by the municipality giving the guarantee. The purpose for which money is loaned include the following:—

(a) To procure short term loans for its members for paying the cost of farming operations of all kinds and increasing the production of farm products and particularly for the following purposes:

(1) The purchase of seed, feed, and other farm supplies;

(2) The purchase of implements and machinery;

(3) The purchase of cows, horses, sheep, and other live stock;

(4) The payment of the cost of carrying on any farming, ranching, stock-raising, dairying or other like operations;

(5) The payment of the cost of preparing for cultivation.

(b) To act as agent for the members in purchasing goods, chattels, effects, stock, grain, coal, wood, lumber, merchandise, or any other article or commodity required by subscribers and in selling any products produced by subscribers;

(c) To promote co-operation among its members for the improvement of conditions of farm life.

Loans are secured by making application to the secretary, who takes the application before the board of directors. The board may require such securities as they think necessary for the protection of societies against loss. The rate of interest is that agreed upon between the borrower and the lender. The interest charged must include a proportion for carrying on the business of the association.

The third Act is called "An Act to foster and encourage agricultural development by means of standard forms of investment upon farm mortgages and the equalization of rates of interest." It is not a co-operative Act in the ordinary sense, but is co-operative in this sense, that it is an organization of the credit resources of the province based on agricultural lands through Government initiative, and, by it, the holders of land may secure through the Government long term loans at low rates of interest, and running over a period of thirty years subject to annual repayments on the amortization plan. This Act is controlled by the Treasury Department of the province. It is administered by the Commissioner of Farm Loans and a board called the Alberta Farm Loan Board. This third Act is not operative at present. It requires large sums of money, the source of which has been up to the present the United States. With the entry of the United States into the war, these supplies have not been available, and loans at present are not being made under this Act.

Consolidation is one of the first steps in bringing to the country the educational advantages of the town. The consolidated school means concentrated educational efforts. It makes possible an extent of school provision that is unthinkable in the small one-teacher country school. It is a war measure, because it will mean better teachers, better agriculture, and better facilities for helping the Government in its need for trained men.—*P. P. Claxton, U. S. Commissioner of Education.*

HARDY ALFALFAS

Where alfalfa succeeds the success of agriculture is assured. To discover the varieties suitable for the different altitudes and areas of Canada, experimenters have been diligent in the selection of those possessing hardiness and productivity. The past severe winter has eliminated many sorts that were previously considered hardy, as is shown by the following reports:

NOVA SCOTIA

BY JOHN M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE

WE have used two varieties of alfalfas in our field plots at the Nova Scotia Agricultural College,—Grimm and Ontario Variegated. Both varieties came through the severe weather of last winter in good condition, while common red clover in adjoining plots was killed out completely. In addition to these two varieties, we planted last summer (1917) seed from plants obtained two years before from Prof. N. E. Hansen, of the South Dakota Agricultural College. Prof. Hansen is the well known explorer who has secured a great many varieties of hardy plants from Northern Russia for the United States Government. We raised a small amount of seed from a number of these plants and sowed it in August, 1917. The plants grew well last fall, and came through last winter without being killed, but are not in a vigorous condition. We have not gone far enough as yet with this test to gain any information of value.

QUEBEC

BY REV. PERE ATHANASE, O.C.R., OKA AGRICULTURAL INSTITUTE

THE common field alfalfa which has been grown here for several years has not in the least been damaged by the hard frosts of last winter.

During the last two years we have been trying eight varieties of hardy alfalfa, six for the production of seed and two for the production of fodder. Varieties grown for seed are the following:—Lyman's alfalfa, Grimm No. 130, Grimm No. 338, Grimm No. 72, Montana, Dry Land. Varieties grown for fodder are: Ontario Variegated and Grim. Although last winter was extremely cold, none of these varieties was damaged, and the growth is very healthy. The average height of the alfalfa is about six inches now, and, if the weather keeps on being favourable, four crops are anticipated instead of the usual three.

BY BROTHER M. LIGUORI, SECRETARY, EXPERIMENTAL UNION

DURING the last five years over a thousand pounds of alfalfa seed of various varieties were distributed throughout the province of Quebec by the Quebec Farmers' Experimental Union. The result of these experiments has already been published, and we are glad of this opportunity to state again that alfalfa thrives well in all parts of the province and under all climates, under the climate of Montreal as well as under that of the Abitibi and of Lake St. John districts, in the Eastern Townships as well as on the Gaspé coast.

But the ordinary condition of success must not be neglected: deep soil, well tilled, well drained, by natural or artificial means, free from acidity and free from weeds, specially couch-grass.

Of the varieties that have been tested, the following have given the best results and proved the hardiest-:

1. A variety imported from Belgium, but which can no longer be secured.
2. The Grimm variety, produced in North Dakota. When grown under good conditions, practically no failures have been recorded with this variety during the last four years.
3. The Grimm variety, purchased from ordinary tradesmen, but at lower prices, 30 to 35 cents a lb., has proved inferior to the preceding one.
4. A variety known as Dakota Black Hill proved to be fairly hardy, but not generally as satisfactory as the Grimm. The causes of this inferiority have not been positively ascertained as yet.
5. Owing to the difficulty to secure seed of the Ontario Variegated alfalfa, this variety has been tried only once and on a very small scale.

However, the small quantity of this seed which we were able to secure did very well at the Oka Agricultural Institute, where it was grown, however, under exceptionally good conditions. We are anxious to secure a further supply of seed of this variety in order to have it tried throughout the province of Quebec.

It should also be stated that the object of our efforts has been to find out whether alfalfa could grow and live in the various parts of the province, and not so much to ascertain the comparative yields of the different varieties.

It should also be stated that poultry men are particularly pleased with the results given by alfalfa, which is rapidly gaining in favour among them.

MACDONALD COLLEGE

BY R. SUMMERBY, B.S.A., LECTURER IN CEREAL HUSBANDRY

THE winter of 1917-18 bore with more than ordinary severity on alfalfas, grasses, and clovers at Macdonald College. Several plots of orchard grass, and most plots of red clover have been winter-killed, while a number of blocks of alfalfa sown broadcast and in rows, that have survived all winters since they were seeded in 1912 and 1913, have been from 75 to 90 per cent winter-killed. Other plots of alfalfa that have come through a number of severe winters with little injury have this year been more seriously damaged.

The autumn of 1917 was marked by showery weather, which continued until the middle of November, when a sudden drop on temperature resulted in the land freezing up on November 19th. Extreme cold weather, accompanied by frequent strong winds, prevailed from this time and continued throughout the winter months. An abundant supply of snow kept the ground covered, although rather unevenly, until late in March, when it disappeared somewhat rapidly, leaving meadows and pastures practically bare. Two severe frosts occurred in April, which did much damage to crops that are apt to suffer during this season of the year.

A deal of the alfalfa at Macdonald College was allowed to go to seed in 1917, with the result that it was cut late, and had little aftergrowth when winter set in. This afforded little protection to the crowns, held little snow, and, together with the saturated condition of the soil at the time of freezing up, made conditions extremely good for winter-killing.

Although more than the usual amount of snow fell during the season, the frequent winds, where no aftergrowth was present, made certain spots bare at times, and in such cases the crop has been largely killed. Then, too, a considerable amount of alfalfa that came through the winter was seriously damaged through the effect of the heavy frosts occurring during the latter part of April.

The results of the tests this year under these severe conditions again strongly emphasize the importance of leaving a good growth to freeze down to hold the snow and to protect the crowns.

In previous work with this crop a number of varieties, including the Grimm, showed themselves to be particularly hardy. This variety has again shown hardiness, but has been more severely winter-killed than ever before. A number of new and improved strains that are in the row tests seem to be completely resistant to conditions as they have existed this year, for, although on heavy soil with little aftermath, and, where ordinary alfalfa has frozen out almost every year, these new strains have not been winter-killed at all.

Hardy varieties, given good condition for wintering by making provision for aftergrowth and drainage, seem to be the most important factors in preventing winter-killing.

ONTARIO

LANARK COUNTY

BY F. FORSYTHE, B.S.A., AGRICULTURAL REPRESENTATIVE

IN the county of Lanark we have several alfalfa demonstration plots. These are planted with the Grimm variety, so that we have no evidence as to the relative vitality of different sorts. The plots were put in two or three years ago and today will average an eighty-five per cent stand. The purpose of these demonstrations is to prove to farmers that alfalfa will stand our climatic conditions providing the right variety is sown. Many farmers had tried to grow alfalfa, but failed. The demonstrations, it is hoped, will encourage many to again begin raising this crop. The plots are scattered fairly widely throughout the county, and are thus demonstrating to a wide circle of farmers, the lessons they were established to teach.

WATERLOO COUNTY

BY J. S. KNAPP, B.S.A., AGRICULTURAL REPRESENTATIVE

THE Grimm and the Ontario Variegated are the only varieties of alfalfa that have given satisfaction in the county of Waterloo. Farmers who have been able to secure seed of these varieties have fairly good stands. Our farmers have practically given up sowing alfalfa, except where they can secure seed of these varieties.

MANITOBA AGRICULTURAL COLLEGE

BY W. SOUTHWORTH, M.S.Agr., F.L.S., AGROSTOLOGIST

THE weather conditions during the recent winter, if not so severe as usual, had an unusually destructive effect on our winter crops. One of the causes of this excessive winter-killing was the want of protection, owing to the limited snowfall. Yet, when we consider that our recorded snowfall during 1917-18 was only about three inches less than that of the winter of 1916-17, there must have been influences other than simply deficiency of snowfall to cause such a difference in the killing effects during the two winters.

From meteorological reports supplied by Professor S. C. Lee, of the Physics Department, we find that in the winter of 1916-17, 23.4 inches of snow fell before the end of December, and the mean monthly temperature for the month of December was 1.92 degrees F. Comparing this with the record for the last winter, we find that up to the end of December only 11.45 inches of snow fell, and the mean temperature for December was about 9 degrees lower than that recorded for December, 1916. Also, owing to the prevalence of high winds, the snow which did fall was practically all swept from the open fields, thus leaving the crops exposed to a comparatively low temperature, with practically no protection from the snow.

On comparing the mean temperatures of 1917 and 1918, during the months of January and February, we find that in 1917 the average mean temperature for these two months was about 12.0° F., that is 7 degrees F. lower than the average mean temperature during the corresponding months of 1918. Hence we may conclude that a study of the weather during the past two winters indicates that a bare statement of the mean temperatures and total snowfall may not, in themselves, furnish a very satisfactory explanation of the real cause of winter-killing in any given winter. But in order to obtain a reliable interpretation of weather effects, the incidence of snowfall and temperatures and wind should be studied in correlated manner.

Observations on the injury caused by winter-killing have shown that, on the plant breeding plots, the most marked effect was seen on alfalfa. On some parts of the row plots sown in 1915, fully 80 to 90 per cent of the plants were killed. One of the outstanding features observed in these plots was that, out of about 40 different strains from various sources, it was found that Grimm alfalfa was more resistant to winter-killing than any of the other commercial strains. On the selection plots similar results were obtained. Out of about 20 selections from various sources, sown in 1916, nearly all were killed out very badly. The only one which showed any real capacity to resist winter-killing was one from a Grimm strain, and, even in this strain, a high percentage of plants were destroyed or considerably weakened.

The alfalfa plants showing most resistance to winter killing we find in the Yellow-flowered or Falcata variety, or in hybrids between this and common alfalfa. A plot adjoining the hardy Grimm strain mentioned above was planted with these Falcata hybrids. Over 90 per cent of the plants came through the winter and are growing vigorously. Other hybrids between alfalfa, sweet clover, and Black Medick are also showing very hardy characteristics, and, on the whole, have come through the past winter in a creditable manner. As these hybrids have only been through two winters, it is as yet too early to venture an opinion as to what extent they will resist our severest winters. However, we may assume that those plants not materially injured by the trying conditions of last winter are reasonably hardy, but it yet remains to be seen if their seeding properties, and crop producing capacities, are of sufficient merit to warrant them being classed as desirable mother plants for the production of select strains for general farm purposes.

SASKATCHEWAN

BY L. E. KIRK, B.S.A., SCIENTIFIC ASSISTANT IN CHARGE FORAGE CROP WORK

THE spring condition of our alfalfas this year indicates that the past winter was one of the most trying we have ever had. Observations on the experimental plots bring out the following points:

(1) Excessive winter killing of the hardiest commercial varieties, including much of the Grimm.

(2) The greatest injury was sustained by the oldest plants, those planted in 1917 suffering very little.

(3) The efficient protection afforded by a fall growth was very marked. The small amount of winter killing where there was even a light fall growth as compared with the same variety where the plots were cut late seemed to be out of all proportion to the protection given.

(4) Winter killing was much more extensive and complete where the plants were more or less injured by the previous winter. There is no question that partial injury sustained during the winter of 1916-17, although it did not prevent the growth of the plants, contributed largely to complete destruction during the past winter.

(5) Many of our hardy selected strains out of Grimm sustained no injury under the same conditions. These together with a few falcatas are the only alfalfas that completely survived under exposed conditions.

(6) Alfalfa seeded in 1917 in rows three feet apart survived the winter much better than that seeded in drills six inches apart. Owing to the exceptionally dry season, the latter made only a small growth with consequent little protection, and two-thirds of the plants winter-killed.

(7) Plots of Grimm that were left for seed last fall, suffered more than any others of the same variety, and the injury was in direct proportion to the yield of seed.

Altogether the results serve to further emphasize the need of hardier strains of alfalfas, and also to justify the use of Grimm as our hardier stock. Some sort of protection appears at present to be the best way to insure against winter-killing. When two severe winters follow one another, with a dry summer in between, the need of securing a considerable fall growth after the last cutting seems essential.

ALBERTA

BY J. McCAIG, M.A., EDITOR OF PUBLICATIONS

REGARDING the hardy varieties of alfalfa, our experience leads to the conclusion that the best varieties for Alberta are Grimm and Baltic and these are equally good. This applies to all parts of the province, though most of our alfalfa has been grown in Southern Alberta so far. Turkestan has given very moderate results, even under the best conditions. Siberian is not recommended. The method under which these succeed best is the sowing in rows, thirty-six inches apart, at the rate of two and a half pounds per acre. No seed of any account has yet been produced on the Demonstration Farms, or on the experimental plots of the Schools of Agriculture. The best seed available at present is the Grimm seed secured from Mr. McGregor of the Canada Land and Irrigation Company.

PLOUGHING MATCHES

MANITOBA

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

OWING to the scarcity of help it was considered by many that the ploughing matches should not be held this year, but so popular is this feature of agricultural society work that, with very few exceptions, matches were held as usual, and the interest shown by both spectators and contestants proved the wisdom of continuing the matches.

TWIN FURROW FINISH AT THE PLOUGHING MATCH, PORTAGE LA PRAIRIE

A STRAIGHT AND EVEN FURROW TURNED BY A TRACTOR DRIVEN BY A 13-YEAR OLD BOY AT THE PLOUGHING MATCH, PORTAGE LA PRAIRIE

Altogether 24 matches were held, the number of contestants ranging from 10 to 80, and the number of visitors from 150 in one place to close on 2,000 at Crystal City and Beresford, and 4,000 at Portage la Prairie. At the latter place, the first day was devoted to contests in which horses provided the motive power, while, on the second day, gas tractors drawing two or three ploughs took the place of horses, and the concensus of opinion was that the work done by the tractors was equally as good as that done by the horses. Several of the men who stood high in the contest with horses on the first day excelled also on the second day, thus showing that the farmer of to-day is a versatile individual.

It is frequently said that a boy loves a man's job, but never was that fact more clearly demonstrated than on the second day at Portage, when Clarence Yuill, aged 13, on a Heider tractor, drawing two Rock Island ploughs, won third place in a field of over 30; and he deserved to win, as the work, including the strike out and in, and out at the ends, the most difficult feature in tractor ploughing, was almost perfect.

THE SCORE CARD

The score card in use at all of the matches is as follows:—

AGRICULTURAL SOCIETY............................ CLASS..................

	Possible Score	1	2	3	4	5	6	7	8	9	10	11	12	13
Crown....................	15	...	...	...	...	...	...	...	...	...	...	...	...	...
Straightness...............	15	...	...	...	...	...	...	...	...	...	...	...	...	...
In and out of ends..........	5	...	...	...	...	...	...	...	...	...	...	...	...	...
Depth and width of furrow..	15	...	...	...	...	...	...	...	...	...	...	...	...	...
Evenness of top of land	10	...	...	...	...	...	...	...	...	...	...	...	...	...
Finish....................	15	...	...	...	...	...	...	...	...	...	...	...	...	...
Covering weeds and stubble.		...	...	...	...	...	...	...	...	...	...	...	...	...

SASKATCHEWAN

BY THOS. M. MOLLOY, SECRETARY, BUREAU OF LABOUR

IN no time in this province within the last seven years, at least since I have been in charge of the work of encouraging ploughing matches, has there been any prizes offered for narrow guage, high cut ploughing. The effort has always been made to encourage superior work with implements which cut and cover the ground, not more rapidly, but more perfectly. It is only in a few of the older localities where old country ploughmen still compete for supremacy that the up-to-date working plough is used. Some very excellent work has been done with these implements, and I personally regret that these are not more in use. Some of the ploughmen from year to year have secured very high averages with our score cards. In the locality of Saltcoats, where they have a ploughing match every year, as high as 99 per cent has been awarded to some of the ploughmen with a walking plough. For a number of years we have had sixty ploughing matches per annum in the province of Saskatchewan, although this season and last there has been a slight falling off owing to the fact that a number of our younger ploughmen have had to enlist. Nearly all the ploughing at the competitions at the present time is being done with sulky ploughs and gangs, the gangs being in the preponderance. However, in the last two years there has been a strong development in the ploughing with tractors. This feature has become very popular indeed, and most excellent work is being done, especially with the smaller tractors which will pull three bottoms. Here is a list of rules and regulations which were compiled by myself as a suggestion to organizations wishing to undertake ploughing matches:

SUGGESTED RULES FOR PLOUGHING MATCHES

The following rules have been compiled from those in force at numerous ploughing matches. They are intended as a guide to the agricultural societies, and may have to be changed to suit the particular ideas and conditions of any society. For instance, rules 9 and 10 may be changed to mean the opposite.

The three following suggestions are given as to who shall compete.:—

(a) Competition open to all comers.

(b) Competition open to all members of the agricultural society.

(c) Owners of teams or their *bona fide* servants must run ploughs.

The last condition prevents an outsider (possibly a prize ploughman) coming in, hiring a team, and winning the prize.

RULES

1. Entry fee of $1.00. Boys under 16 free. Any one contributing $2.00 or over to the prize fund will be allowed an entry for himself or servant.

2. All entries must be made before 9 a.m. on the day of the match, but intending competitors are especially requested to notify the secretary at least three days in advance, so that the ground may be staked out in time.

3. All ploughmen must be on the grounds before 9.30 a.m., when lots will be drawn for position. Ploughing will start by signal at 10 a.m., and must be completed by 4 p.m. Any ploughman coming after lots are drawn will be obliged to take his lot in rotation with those who have drawn and finish not later than the time limit. Any ploughman not finished when time is called will be ruled out.

4. The land to be ploughed shall not be more than ¾ acre for single-furrow ploughs and 1½ acres for two-furrow ploughs.

5. Each ploughman will make one strike out and one finish. All crowns must be opened out not less than three inches deep. Five rounds shall constitute the crown. The two first furrows thrown out against the adjoining crown shall not be judged. The judges may call a short stop to judge the crowns, but an equivalent in time shall be allowed the ploughman.

6. No person shall be allowed to interfere with, or help, the ploughman except in setting up and removing poles, and no person will be allowed to accompany the ploughman.

7. In all cases the crowns must be opened out and finished with the same plough and team that are used throughout.

8. The depth of the ploughing to be five inches and the width of the furrow the same as the width of the plough used. Two rounds to be allowed to attain proper depth. The sole furrow is not to be lifted, and ploughmen are not required to finish a furrow of full width.

9. Guage wheels to be allowed in all classes.

10. Chains or other devices for covering weeds to be allowed, but all weeds must be cut.

11. No pulling or covering of weeds with either hand or foot, or tramping of land with feet allowed. Anyone not conforming to this rule will be reduced one point for each offence.

12. In any class where not more than one entry is made, the judge shall decide what prize, if any, shall be awarded. The judges have a right to withhold a prize if 50 points have not been made.

13. Any ploughman not conforming to these rules will be disqualified.

14. Protests must be lodged with the secretary by noon of the day following the match, and must be accompanied with a deposit of $2.00. The decision of the committee in charge of the ploughing march shall be final.

SUGGESTED CONDITIONS

1. Men's 14-inch walking plough.
2. Men's 16-inch walking plough.
3. Men's 16-inch sulky plough, 3 horses.
4. Men's 2 furrow gang; 14-inch, 4 horses
5. Men's single disc plough, 3 horses.
6. Boys under 16, 14-inch walking plough
7. Boys under 16, 16-inch walking plough
8. Boys under 16, 16-inch sulky plough, 3 horses.
9. Boys under 16, 2 furrow gang, 14-inch, 4 horses.
10. Boys under 16, single disc plough, 3 horses.

Similar prizes may be arranged for young men from 17 to 21, or 24.

If little work is done in the district with walking ploughs, drop them out and give prizes for the kind in general use, so that it does not put a man about to practice for the match.

The rules and suggested prizes have been framed for stubble land. Why not have a ploughing match altogether on breaking? Reduce the area to be broken, and test the gangs and disc also.

PRINCE EDWARD ISLAND

PRODUCTION ACTIVITIES OF WOMEN'S INSTITUTES

BY HAZEL L. STEARNS, SUPERVISOR OF WOMEN'S INSTITUTES

EVER since the need for greater food production has been brought to our notice, the women's institutes have worked zealously towards this end, as well as towards the conservation of food.

The canning and drying of fruits and vegetables have been fully discussed and demonstrated and bulletins containing complete directions have been distributed.

At the fall exhibition in Charlottetown, demonstrations were given by the Women's Institute Branch in the canning and drying of fruits and vegetables. The methods of using the various substitutes in bread making were explained. A number of varieties of war breads were exhibited, and pamphlets dealing with war time cookery were distributed.

Last October a new household science kitchen was opened in Charlottetown. The work carried on here was under the direction of the Women's Institute Branch, and included the teaching of household science to the public school classes, together with the short course classes held during the winter months, and open to the women of the country districts. Special classes were held each Saturday for the teachers of the Charlottetown schools. With every class, war time cookery was dealt with and the utilization of the substitutes for sugar, wheat, and fats was particularly emphasized

This year the demonstrations on canning and drying will be continued, and at the present time demonstrations, dealing particularly with the use of the wheat, sugar, and butter substitutes, are being given to every institute.

QUEBEC

MACDONALD COLLEGE

WORK IN SHEEP HUSBANDRY

BY H. BARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

DURING the charge of the sheep industry by Mr. A. A. MacMillan, who recently severed his connection with Macdonald College, and who was an appointee remunerated from funds derived under THE AGRICULTURAL INSTRUCTION ACT, of the Dominion, the sheep industry received a great impetus in the province of Quebec. Mr. MacMillan was placed in charge of the work in 1914. In THE AGRICULTURAL GAZETTE, Vol. IV, page 582, Mr. MacMillan gave a descriptive article on demonstration sheep flocks in which he described the progress that was being made. He speedily recognized that there was need for local organization in sheep work, and, to meet this need, arrangements were made for organization within the different counties. Considerable work had been done in Pontiac county in connection with sheep, so that it was decided to make that county the starting point. Together with the college demonstrator at Shawville, Mr. MacMillan organized an association, after spending a great deal of time cultivating the ground for it. Following this association, a number of smaller organizations within the county were formed, all of which were linked to the parent association. The objectives of the association were three from the outset—the preparation and marketing of wool co-operatively; the purchase and exchange of pure-bred sheep, especially rams, co-operatively; the marketing of lambs co-operatively. The Live Stock Branch was asked to assist in this work in furnishing graders for the wool. On this basis the Pontiac association made a start in 1914, when 11,796 pounds of wool were marketed at a price of 21 to 23 cents per pound, this being an advance of from 5 to 7 cents on the prevailing prices.

The next year other counties were cultivated and associations formed. The success of the movement along all three lines has been marked and has been reported from time to time. When this work was commenced the average man had little or no conception of how to market his wool. Last year pure-bred sheep were sold from Quebec to practically every province in Canada. A real start was made in the marketing of lambs co-operatively, so that when Mr. MacMillan left the sheep industry was progressing rapidly on a sound business basis.

THE AUTOMOBILE AND THE AGRICULTURAL REPRESENTATIVE

BY F. N. SAVOIE, SECRETARY FOR AGRICULTURE

IN order to facilitate the work of our Representatives and enable them to better answer the needs of the agricultural communities, it was decided this year by the Minister of Agriculture to authorize them to purchase automobiles. Experiments and investigations on the various means of transportation have shown that the automobile is not only the quickest, but also the cheapest, way of travelling, in proportion to the number of miles travelled, and the one giving the greatest satisfaction to the farmers. Agricultural Representatives travel from four to six days per week. They may, at times, have to go quickly from one end of their district to the other.

The large number of requests that are received for the services of the Agricultural Representatives make it necessary to place each Representative in charge of two or three counties. Some of them have to cover a large territory, where communications by water or rail are often unsatisfactory, while country roads may be good enough to permit the use of the automobile. With the development of agriculture, the increased interest which farmers are taking in their work, the services of the Representatives are becoming more and more appreciated. Requests for visits and information, the needs of agricultural organizations are more numerous than ever, and the time of the Representative becomes more valuable. It was necessary, therefore, to adopt a rapid means of transportation, which would enable more work to be done and save time.

There are now twenty Agricultural Representatives representing thirty-seven rural counties of the province.

Representative	District	Residence
Albert, J. N.	Bonaventure and Gaspé	Bonaventure.
Belanger, A. J. M.	Chicoutimi and Lac St-Jean	Roberval.
Blondin, E. N.	Beauharnois, Chateauguay, and Huntingdon	Huntingdon.
Brunel, P. A.	Montmorency and Quebec	Quebec.
Cloutier, Henri	Chambly, Iberville, and Rouville	Richelieu Village.
Delaney, Wilfrid	Rimouski and Temiscouata	Rimouski.
Fortin, J. A.	Champlain	St. Stanislas.
Gagnon, Roger	Kamouraska and L'Islet	Ste. Anne de la Pocatière.
Hodge, C. H.	Pontiac	Shawville.
Landry, Arthur	Bellechasse and Montmagny	St. Charles.
Leclair, J. M.	Abitibi	Makamik.
MacDougall, W. G.	Sherbrooke and Stanstead	Lennoxville.
Magnan, J. C.	Portneuf	St. Casimir.
Parent, L. V.	Richmond and Shefford	Richmond.
Plante, J. A.	Nicolet and Yamaska	Nicolet.
Raymond, Abel	Arthabaska and Megantic	Plessisville.
Rousseau, R. A.	Bagot and Drummond	Acton Vale.
Roy, L. C.	Compton and Frontenac	Lac Megantic.
St. Arnaud, Rod	Maskinonge	Louiseville.
St. Hilaire, Pierre	Beauce and Dorchester	Beauceville West.

In order to encourage the Representative to take care of his auto, while making use of it to the fullest extent, the Minister has decided to give each the choice of two systems, by which the Representative owns his auto, but receives complete refund of the value for the use which he makes of his motor car in official trips. The first of these systems applies to Representatives having sufficient means to purchase a motor car without borrowing. The second enables the Representatives who have no such means to purchase a machine without being compelled to borrow.

FIRST SYSTEM—REFUND BY MEANS OF ANNUAL DEPRECIATION

The Representative is entitled to an allowance for yearly depreciation of twenty per cent, with interest at six per cent on the amount paid, payable half at the beginning of the season and the other half at the end. The annual license, fire insurance premium, expenses in gasoline, and repairs are paid by the Department.

SECOND SYSTEM—REFUND OF TWO-THIRDS OF PURCHASE PRICE

The Representative is entitled to a refund of two-thirds of the purchase price of the motor car and of the cost of shipment to destination. The remaining third is paid by himself. The annual license, the fire insurance premium, and expenses in gasoline and repairs are paid by the Department, as in the other system. The Department reserves a right of ownership on the machine equivalent to the amount paid to the Representative for the purchase of the same. After each year of service, this right of ownership decreases in the proportion of 20 per cent of the purchase price, until the third year. Then the motor car is the entire property of the Representative. If the latter desires to sell it, he can purchase another with one or the other system of refund. If he keeps the same machine, he cannot receive any refund for depreciation or interest.

These two systems are based on the price of a motor car not exceeding $1,200, in addition to the cost of shipment.

THE REQUIREMENTS

Conditions to be fulfilled in order to take advantage of these two systems of refund:—

1. Any expenditure of gasoline, oil or repairs, appearing on the monthly statement of expenses, must be accompanied by a voucher.

2. The Representative must show on his monthly statement of expenses, the number of miles travelled in official trips during the month, and certify that the expenses on account of motor car were necessitated by his official duties.

3. The Representative must not rent or lend his motor-car to any one. He must not make trips with or without charge for private parties.

4. The Representative must undertake to carry free of charge the officials or the guests of the Department of Agriculture, providing such trips are done for agricultural purposes.

5. The Representative must, as much as possible, take the time necessary, once a week, to make an examination of the machine, to see that it is in good order, well oiled, and that each vital organ is intact.

6. The Representative is supposed to use his machine from the 1st of May to the 1st of November. If, in the meanwhile, he has to use a livery owing to certain conditions, he must produce a voucher for each livery expense mentioned in his statement of expenses.

7. The Representative must fill a questionaire giving a description of his auto, number of manufacture, and the number of tires on the machine and of repair tires. At the end of the season worn-out tires must be returned to the Department of Agriculture, the numbers of each being checked.

Both these systems were tried last year and the results were most satisfactory, in spite of the unfavourable temperature which prevailed in the districts where Representatives were stationed. Some Representatives have travelled over 10,000 miles during the season, and have succeeded in satisfying, by this conveyance, the majority of requests coming from the farmers of their districts.

All our Representatives, with the exception of the one in Abitibi, where the condition of the road does not allow the use of an automobile, were able to purchase a motor car by one of the afore-mentioned systems of refund. Four have chosen the system of refund by annual depreciation, and the others have preferred the two-thirds system.

ONTARIO

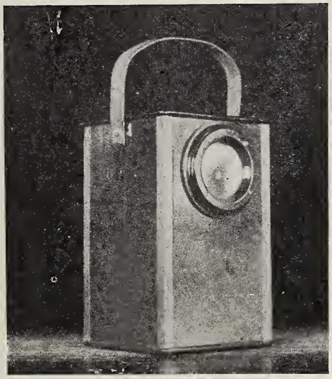
LOCATING UNDERGROUND STREAMS

BY WM. H. DAY, B.A., PROFESSOR OF PHYSICS, ONTARIO AGRICULTURAL COLLEGE

SUBTERRANEAN streams usually provide the best supplies of water, both as to quality and quantity. The difficulty is that the striking of them is generally a matter of pure accident. From early ages, certain individuals have claimed the power of being able to locate such streams by aid of a forked twig from various trees, such as plum, cherry, hazel, etc. And it is undeniable that in many instances, phenomenal wells have been struck by digging or drilling on sites selected by these "water diviners," in spite of previous failures in the locality. For many years scientists as a class have stoutly denied the possibility of there being any virtue in this method of locating water, but in recent years, as the result of some investigation on the subject, a considerable change has come about, many not only admitting the possibility of the method being genuine, but actually expressing their belief in it. We understand the French Department of Agriculture has a staff of diviners, whose services are available on application. The chief drawback to the method is the opportunity given for trickery.

A WATERFINDER

Another method has come into vogue recently, viz., by using an instrument known as a waterfinder, a photograph of which is shown. This is an electro-magnetic instrument, patented by an English firm. In the lower compartment, according to the English letters patent, is a coil of fine iron wire about six inches long and five inches in diameter. The coil has no metallic core. The ends of the wire are free. The layers are separated by paraffin wax and interspersed occasionally by sheets of lead foil. In the upper chamber is a very slender, delicate magnet 5 inches long, turning on a pivot at its centre. It is magnetized so as to have a north pole at each end, one being the least shade stronger than the other. This method of magnetizing the needle is patented. When preparing for a test, the coil is set by compass with axis north and south. The needle is then placed on the pivot and points in a north and south direction when it becomes steady. If no underground stream runs below, the needle will lie almost motionless, but if there is a stream underground then the needle will suddenly swing out to one side and then oscillate back and forth, the oscillations gradually diminishing in amplitude. It may come back to rest or it may receive another impulse before doing so. There is no regularity of impulses either in time or strength.



AN ELECTRO-MAGNETIC WATERFINDER

THE PRINCIPLE

The principle of the instrument apparently is not definitely established. Those who have studied it are pretty well agreed that the action is in some way due to fluctuations in the earth currents of electricity which follow the underground streams of water. Some believe that these fluctuations cause momentary changes in the magnetism of the coil, which disturbs the magnetic equilibrium of the needle, causing the oscillations. The makers of the instrument claim that the oscillations are due to "earth air currents of electricity"—perhaps electric waves would be a better term—originating in the fluctuations of the electric current in the stream. And some even claim that there is no virtue in the instrument whatever. Water Supply Paper 416, U.S. Geological Survey, Washington, pages 23-25, concludes with this opinion: "In the present state of knowledge any claim that the oscillations of a magnetic needle indicate the occurrence of available ground water is purely speculative." If the author of this paper had related details of tests with the waterfinder made by himself or others, and which resulted negatively, his opinion would have carried more conviction. One thing is certain, the needle does oscillate in some locations and not in others —we have proven that over and over again by actual trial. And in India, under the direction of Dr. Harold H. Mann, Principal of the Poona Agricultural College, at least sixteen wells have been sunk on sites selected by the instrument in the trap region of Western India, where water is proverbially hard to find, water being struck in every one of the sixteen, and Dr. Mann's conclusions, quoted from his Bulletin No. 72 of 1915 entitled: "Experiments with the Automatic Waterfinder" is as follows:—

> The position as a result of our work is, therefore, that in a country where at least forty per cent of wells under normal circumstances are failures, even in selected sites, wherever the automatic waterfinder has indicated water, and a careful test, including boring, has been made, water has

been found. As a rule the supply indicated has been within the depth of well sinking; in a few cases, sub-artesian water has been found by boring, at depths varying up to 126 ft. Only one criticism can be made of these results, I think, and that is, that similar borings would under almost all circumstances reach a water supply of some sort. Other borings, in what were considered likely sites, do not justify this conclusion. These have only given 66 per cent of successes, as against complete success when the waterfinder has been used and has indicated water.

It must be confessed, however, that we have so far found no method of using the instrument which enables us to say with certainty the depth at which the water will be found, or its quantity. Messrs. Mansfield & Co., the makers of the instrument we have used, state that they can tell, within small limits, the quantity of water to be obtained, but we have not been able to do this.

It would seem, however, sufficiently proved that under the conditions which prevail in the trap areas of Western India, where underground water occurs in well-defined streams flowing in rock fissures, sometimes under little or no pressure, and sometimes under considerable pressure, the automatic waterfinder can be used with advantage in locating streams of water which can be tapped either by well digging or by boring.

Mr. G. B. Brooks of the Department of Agriculture, Queensland, Australia, has also done some very interesting work with the waterfinder, combining it with the divining rod method, and tracing underground streams by both. In spite of the fact that water is very scarce in the areas where the waterfinder has been used by him, no failures are recorded on sites selected by the instrument.

CHILD WELFARE WEEK IN BRAMPTON

BY J. W. STARK, B.S.A., AGRICULTURAL REPRESENTATIVE, PEEL COUNTY

CHILD Welfare week in Brampton was conducted by the Peel Department of Agriculture, co-operating with the Ontario Board of Health, the local doctors, Women's Institute, Red Cross society, girls' club, and the schools.

First of all a meeting of the local doctors was called in my office, where the whole matter was dealt with by a representative of the provincial Board of Health. The doctors promised their fullest support to the movement.

A meeting was next called of six representatives from the local women's organizations. On the plan being outlined to them, they passed a resolution pledging their support. In order to systematize matters, it was decided to have each organization take some definite part. The Women's Institute was asked to prepare an exhibit dealing with the whole question of feeding. This included six sections: diet for a baby 12 to 18 months, showing six meals; diet for a baby 18 to 24 months, showing four meals; diet for a child 2 to 3 years, showing three meals; diet for a child 3 to 6 years, showing three meals; a nutritious cold lunch properly prepared for school children, and a small equipment that would be suitable for use in a rural school for preparing one hot dish to supplement the cold lunch.

The Red Cross society's exhibit was entitled, "A model sleeping and play room for growing a healthy baby." This showed the right type of baby carriage, kiddie-koop, toys, etc., etc.

The girls' club prepared a baby's layette, all of which was home made.

All the exhibits were supervised in a general way by the staff of the Agricultural Representative, who gave assistance to the local organizations by supplying them with literature on the subject. The local dairy planned out a pure milk exhibit.

METHODS AND RESULTS

The local ministers either preached a sermon on child welfare, or made a full announcement regarding it. A letter was addressed to each mother in Brampton having a child under three years of age, inviting her co-operation, and pointing out the objects sought to be attained and the reasons for the movement. Clinics were held on two days, June 25 and 26, the town being divided in half for this. Seventy-six babies were brought the first day and ninety-eight the second day. Most of the children were from the town, but a few came from the country, some coming from as far as 10 to 14 miles. Each child was weighed and measured by the nurses and examined by one of the doctors; we had two doctors and two nurses all the time and three or four women assisting the nurses. A prize was offered for the healthiest child under 18 months of age brought on each day.

The provincial Board of Health sent out a large exhibit, including some electrical displays. On Tuesday evening, June 25th, a public meeting was held to which everyone was invited. The speakers at this were Dr. J. W. S. McCullough, Chief Officer of Health for Ontario, who spoke on "Public Health," and Miss Ethel M. Chapman of *The Farmer's Magazine*, who spoke on "The Child in the Community." A playlet and drill were put on by the school children. The Board of Health showed a few reels of moving pictures relating to health matters.

ONE OF THE EFFECTS

One of the by-products of the Child Welfare week is the interest that has been aroused in the matter of the local milk supply. I had previously taken samples of the milk delivered in the town, and was surprised to find that, with one exception, every sample was below the standard in butter-fat and total solids, and contained *colon bacilli*. At different times I had made an attempt to interest some of the council in a better milk by-law, but they thought the milk supply was quite satisfactory, and now assurance is given that a by-law will be passed immediately. Much interest has been awakened in the whole matter of health, and it is hoped to establish in Brampton a public health nurse whose business it will be to visit all the homes.

AGRICULTURAL REPRESENTATIVE ACTIVITIES

THIRTY-SEVEN members of the Shorthorn Cattle Breeders Club organized in Bruce county, Ontario, by the Agricultural Representative recently, made an excursion, when they visited seven prominent herds in adjoining counties.

The Agricultural Representative in Lanark county, Ontario, in co-operation with the Local Production League, prepared forty gallons each of blue stone and milk of lime for the use of potato growers in the town of Perth. These ingredients are kept at proper strength at the office of the Agricultural Representative. The townspeople who wish to spray their potatoes were allowed to obtain their Bordeaux mixture free.

A COUNTY WINTER FAIR

The Agricultural Representative in Lambton county has brought about a plan whereby the Lambton Corn Grower's Association, the Lambton Pure-bred Live Stock Breeders' Association, and the Lambton Poultry Association will unite to hold their respective shows all during one week. While the executives of the associations will work independently of each other, the programme will be arranged to make a successful county winter fair. The dates set for the three shows are the first Wednesday, Thursday, and Friday of February, 1919.

A COMPETITION PICNIC

The West Wellington Board of Agriculture held a picnic on June 15th, the special features of which were stock-judging contests for boys of fourteen and under and boys between fourteen and eighteen. Twenty boys in all took part. Ten boys participated in a potato-judging contest. A girls' knitting contest followed, fifty per cent of the awarded points being given for speed, 25% for the way the needles were handled, and 25% for the completed work. The picnic was held at Moorefield, where there is a girls' knitting club. These girls had a booth at the picnic and took in $33, which is to be spent in yarn to be used in knitting socks for the soldiers. Mr. R. H. Clemens, the Agricultural Representative, took an active interest in the picnic. Addresses were delivered by Professor Wade Toole of the Ontario Agricultural College and Mr. N. Keith, director of the Y.M.C.A.

CONFERENCE AT GUELPH

During the whole week commencing July 15th, there was held at the Ontario Agricultural College a conference of Agricultural Representatives. Almost every Representative was present during the entire week. The object of the conference was to enable the Representatives to exchange ideas and relate experiences in connection with the various activities that engage their attention, and to listen to federal and provincial officers and others who dealt with important departmental work of special interest to farmers in the present crisis. Much of the time was occupied with considering questions that concern the Representatives in their work. Other subjects taken up were "The Soil Survey", "Wool Grading", "Stallion Enrolment", "The Feed Situation", "Farm Labour", "Co-operative Associations", "The Potato Seed Trade", etc. The conference concluded with an examination of potato plots that had been planted with seed from local, imported, and diseased stock on the College farm, and a visit to, and inspection of, the Horticultural Experiment Station at Vineland. The Hon. Geo. S. Henry, Minister of Agriculture, attended several of the sessions and addressed the conference.

MANITOBA

CONFERENCE OF EXHIBITION AND COMPETITION JUDGES

BY GEORGE BATHO, EDITOR OF AGRICULTURAL PUBLICATIONS

On June 27th and 28th, a conference of forty judges who will officiate at agricultural society fairs and field contests, was held at Manitoba Agricultural College. Prof. T. J. Harrison, the secretary of the conference, had prepared the following report of the findings:

LIVE STOCK CLASSES

PROPER CLASSIFICATION

It was decided that the judge should classify animals with which the exhibitor was in doubt as to the proper classification at a stated time in the judging ring before the actual judging started. As there seemed to be some confusion in regard to classes, a committee was appointed to go into the matter of classification of live stock and report to the Superintendent of Extension Service, this report to be taken up at the Agricultural Societies' Convention in February.

UNSOUNDNESS IN THE HORSE

It was decided to consider in all breeding stock all hereditary unsoundness, such as bone spavin, ring bone, periodic opthalmia, and roaring. Any breeding animal being afflicted with any of these unsoundnesses should not be placed over a sound animal, even of much lesser merit, and, in the larger shows, all breeding animals with these unsoundnesses should be turned out of the ring.

SIDE BONE

It was decided that in breeding stock a sound horse with a contracted hoof head should often be placed below a horse with a large, open hoof head and small side bone.

All unsoundnesses in utility horses should be considered, including the hereditary unsoundnesses mentioned above, the side bone, bog, curb, navicular disease, etc. A utility horse with any of these unsoundnesses should not be placed over a sound horse. In light horses, this is even more important than in the heavy classses.

SHOULD THE JUDGE GIVE REASONS FOR HIS PLACING

It was realized that it is difficult for the judge to give reasons for his placing, but it was decided that it should be done when asked for, after the consent of the exhibitor had been secured.

CLASSIFICATION OF HEAVY HORSES

In the classification of draft horses, type and weight are to be the deciding factors, the type to be of more importance than the weight. The minimum draft weight should be 1,600 lb., the condition of the horse to be considered. In judging draft and agricultural horses, especially in pure-bred classes, more attention should be paid to weight, depth of body, and strength of constitution than in the past. The placement of legs must have more consideration; for example, the closeness of hocks must not be sacrificed for having the legs placed squarely under the body. Length and slope of pastern are not to be essential in the hind legs, but very necessary in the front legs; the collar seat also to have more consideration than in the past.

In judging stallion classes, a coarse head is to be more desired than the feminine head; the opposite to be the standard with brood mares.

DAIRY COWS

Place all breeds of dairy cattle according to the standards of an ideal dairy cow, paying some attention to breed characteristics. All should have general angular appearance, sharp shoulders, width of constitution, deep middle, an udder well attached, long and deep, but not pendulous or meaty. Milk veins to be numerous and large, the number more important than the size; symmetry of type then to be given consideration.

SUMMERFALLOW COMPETITIONS

WEEDS

Four worst weeds to be considered: Quack grass, perennial sow thistle, Canada thistle, and wild oats. Cut ten points if the smallest patch of either of the first two can be found, eight points for the smallest patch of the other two. In regard to weed seeds, it is only possible to detect wild oats in the soil. Where ungerminated wild oat seeds are found, the cut should be severe.

MOISTURE

There are two methods of determining moisture in the soil, by sight and feeling, the general method being to bore down to a depth of two feet with an auger and test the amount of moisture by squeezing a handful of the soil, noting the colour, the cool feeling, and its ability to stand up. The determination of the surface soil moisture can be made by using a shovel. Fifteen points out of twenty-five might be allowed for the surface moisture and ten points for the sub-surface moisture. Different districts have different moisture problems. A judge will have to decide his basis for scoring according to the district.

AVAILABLE PLANT FOOD

It was decided there was no way of determining the amount of available plant food. Therefore, it should be struck out of the score card.

WELL PREPARED SEED BED

The seed bed should be level, fine, firm, moist and deep.

MEANS OF PREVENTING DRIFTING

The presence of fibre, corrugated surface, lumpy mulch, straw, manure and cover crops. The presence of sufficient of the first or last three to entitle a man to a full score, the others to be about one-half to three-quarters.

A committee was appointed to work out a score card, as it was felt the old score card was not satisfactory. The following was the score card adopted:—

SCORE CARD FOR SUMMERFALLOW COMPETITIONS

	Points
Freedom from harmful weeds, ungerminated weed seeds, and live roots..	30
Moisture in top two feet of soil......	15
Well-prepared seed bed—level, fine, firm, moist and deep............	15
Means of preventing drifting, fibre, corrugated surface, lumpy mulch, top dressing of straw or manure, and cover crops......................	20
Feed or pasture produced on land....	10
Headlands and field corners clean, strike outs and dead furrows free from weeds, and not two high or deep..........................	10
Total..	100

WEED VALUES

In standing crop competitions, it was decided to have a statement of weed values. It was felt that the scoring which is used in judging at seed fairs might well be used in judging standing crop competitions.

ELECTRIFICATION OF SEED

BY J. B. REYNOLDS, M.A., PRESIDENT MANITOBA AGRICULTURAL COLLEGE

THE Departments of Field Husbandry and Physics have been working on the problem of the influence of the electrification of seeds upon their germination and the subsequent growth. A treatment is now under way which is being run in three sections, each section dealing with a separate crop, the first being wheat, the second alfalfa, and the third mangles. The treatment in so far as it relates to germination is carried out in triplicate in a cloth germinator and in soil. That is to say, triplicate samples of one hundred seeds each from each treatment are taken and germinated in a cloth germinator while the same number of samples and seeds in each case is taken and germinated in soil under pot culture.

SASKATCHEWAN

QUESTIONABLE GAMES AT EXHIBITIONS

THE Director of Agricultural Extension has drawn the attention of the agricultural society officials in the province to the revised regulations governing the payment of Government grants. Under these regulations, no society which permits the operation of questionable games in connection with any of its activities will be paid the grant which it would otherwise receive. Further than this, it is pointed out that no grant will be paid to any society located in any town in the province where games of a questionable nature are allowed to operate at the time of the annual exhibition.

ALBERTA

RETURNED SOLDIERS' COURSE AT OLDS

BY W. J. ELLIOTT, B.S.A., PRINCIPAL SCHOOL OF AGRICULTURE

THE course put on here for returned soldiers last year was made as practical as possible for those taking it. It is apparent that the returned soldiers who were desirous of securing information that would help them on their farms at once would have little time to devote to the sciences pertaining to agriculture. For this reason we put on a course that would be of interest to men on the land. This kind of a course was also made necessary because of the fact that the soldiers had such a short time in which to secure this information.

In April last year the returned soldiers began to arrive, and our first work was the preparation of the gardens, the setting of hundreds of eggs, and in a general way getting ready for the spring work. Each soldier was given a particular plot of ground of his own, and was held responsible for it. In addition to this, the group of soldiers had an acre of potatoes in common. Needless to say the interest was keen among the soldiers taking the work, and this interest continued during the summer.

n the fall another group of soldiers ntered the institution, and, while he work in the plots of the practical nature was impossible during the winter, yet a course was put on dealing with the feeding and care of live stock, the study of soils and crops, the study of gasolene engines, and also some light blacksmithing and carpentry work. The course was evidently appreciated by many of the soldiers, as we have received letters from them expressing their appreciation of it.

VETERANS WHO ARE TAKING A COURSE IN AGRICULTURE AT OLDS, ALTA.

BRITISH COLUMBIA

SEED PRODUCTION COMPETITION

THE Provincial Department of Agriculture has made provision for provincial seed production competitions, at which prizes of $15, $10, and $5 will be offered for the following: One acre each for seed of wheat, oats, barley, clover, alfalfa, vetch, rye, corn, and field peas; half an acre each of potatoes, garden peas, beans (dwarf), and rape; a quarter of an acre each of mangels, turnips, carrots, garden beets, radish, onions, kale, and parsnips; one eighth of an acre each of cabbage and lettuce.

The rules and regulations provide that any member of a farmers' institute may compete; that plots entered for competition must be clearly defined and marked with stakes, and that when a competition is conducted with crops which mix readily, or where there is a danger of cross pollination, preference shall be given to plots devoted to single varieties.

INCREASED PRODUCTION ACTIVITIES

BY W. T. McDONALD, B.S.A., ACTING DEPUTY MINISTER OF AGRICULTURE

IN the July number of THE AGRICULTURAL GAZETTE, on page 680, there appeared a general statement respecting the activities in this Department to increase production. The following statement provides fuller information as to the special lines being carried out this year:—

1. Fifty thousand dollars has been used in the distribution of first-class seed grain, which has been sold to farmers in various parts of the province and their notes taken in payment. This work will be continued during the fall as applied to seed wheat.

2. Special field men have been at work to encourage greater production, especially along the lines of hog-raising and dairying.

3. Assistance is being given to fruit and vegetable canning clubs.

4. The Government purposes taking over certain land settlement areas which have been held by land speculators, and placing these lands on the market on terms and conditions that will be attractive to settlers.

5. Special efforts are being made to encourage seed production for which various portions of British Columbia are especially adapted.

FLOWER SHOWS CONDUCTED BY WOMEN'S INSTITUTES

BY WM. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

TO encourage the holding of flower shows by women's institutes throughout the province, the Department of Agriculture is providing grants to be used for prizes and other expenditures. Both money and book prizes will be granted as follows:—

(1) A per capita grant of 25c. in addition to the grant given under the terms of the Agricultural Act, 1915, will be made to institutes holding a flower show, or an exhibition of women's work, or a combined flower show and such exhibition.

(2) Book prizes will also be offered by the department for competition at such shows for collections of bulbs, sweet peas, roses, dahlias, perennials, or other varieties of flowers, as may be decided upon by the institute. The prizes will be as follows:—Adults; 1st and 2nd prizes; juveniles, 1st, 2nd, and 3rd prizes.

The Department recommends that in the case of adults, no prizes should be awarded where there are less than three entries, and no second prize where less than four entries. In the case of juveniles, no prize should be given where there are less than two entries, no second prize with less than three entries, and no third prize with less than four entries.

The purposes of consolidation are as follows:

1. To give high school advantages to rural pupils.

2. To provide opportunity for rural pupils to receive instruction in domestic science, manual training, and agriculture.

3. To provide for departmental instruction and organized play that will lead to a better physical development of the school children.

4. To meet community needs by providing an auditorium for community gatherings and community activities.—*J. C. Muerman, U. S. Bureau of Education.*

PART III

Junior Agriculture

DEMONSTRATIONS, COMPETITIONS, AND CLASS-ROOM STUDIES IN RURAL LIFE FOR BOYS AND GIRLS

THE AGE LIMIT OF AGRICULTURAL COLLEGES

Recently the question has been raised as to the advisability—in view of the depletion of the number of students in consequence of the war—of lowering the age of admission to the colleges and schools of agriculture. In several instances the matter has not as yet been taken into consideration, but the subject, it will be seen by the following notes, has engaged the attention, among other institutions, of the Manitoba College of Agriculture, the Oka Agricultural Institute, and the School of Agriculture at Ste. Anne de la Pocatière:

STE. ANNE DE LA POCATIERE

BY REV. NOEL PELLETIER, PRINCIPAL

ON account of the present situation, it has been decided and announced that for the duration of the war, boys of 14 years of age shall be admitted to the courses of the school of agriculture.

OKA AGRICULTURAL INSTITUTE

BY FR. JEAN DE LA CROIX

HERETOFORE, no student under 17 years of age was admitted at our regular course, but as the number of our students will probably be reduced by the new military law, which takes young men of 19 years of age, it has been decided to take this fall young men of 15 years for the regular course and of 14 years for the practical course of two years.

MANITOBA AGRICULTURAL COLLEGE

BY J. B. REYNOLDS, M.A., PRESIDENT

IT has been decided this year to open a special class to accommodate fifty junior students of the ages of fourteen and fifteen years. This class will enter at the same time as the regular students on September 22nd, and the course will close at the same time, March 29th. This class will have the opportunity of taking the regular first year work or selecting special subjects. As an inducement to any student re-entering the college this autumn, a reduction of $5.00 on account of tuition will be granted for every new student, either junior or regular, whom he or she induces to take a winter course.

NOVA SCOTIA

RURAL SCIENCE SUMMER SCHOOLS

THE rural science summer school at Truro, N.S., opened on July 10th with an attendance of 130 and will continue until August 8th. Extra classes are being given this year in canning and milk testing. Two sessions of the class are held during the year. the first opening about the first of May and the second early in July. The subjects include agriculture, horticulture, meteorology, chemistry, biology, plant diseases, entomology, nature study, geology and minerals, wood-work, birds, botany, and physics.

QUEBEC

SUMMER COURSE IN AGRICULTURE FOR BOYS

BY REV. NOEL PELLETIER, DIRECTOR, SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIERE

A number of citizens realizing the seriousness of the situation have asked if it would be possible to have their boys trained in farm work, so that they may work on the farm during their holidays, should the war last some years yet. In order to meet this request, the Ecole d'Agriculture de Ste. Ann de la Pocatiére has decided to open a special course, and has made special arrangements to receive during the summer months pupils of classical and commercial colleges and, in a general way, farmers' sons.

Such course started on the 1st of July and will continue until the end of August as follows:

1st to 15th July	Botany	M. Bouchard.
15th to 25th “	Arboriculture and Bee-keeping	Rev. Levasseur.
25th July to 10th Aug	Horticulture	Rev. Létourneau.
10th “ to 20th “	Agriculture	Rev. Bois.
20th Aug. to 31st “	Live Stock	Mr. Pasquet.

These courses include class and practical work. Pupils spend their spare time after the daily lectures and hours of study at work on the farm under the direction of the chiefs of the department and of professors.

College students are accepted from 12 to 19 years of age for $6 a month, laundry included.

Several subjects will be taught by means of lantern slides in order to appeal to the eye as well as to the mind, as things that are seen are better understood and remembered.

ONTARIO

MANUAL TRAINING AND HOUSEHOLD SCIENCE IN RURAL SCHOOLS

BY A. H. LEAKE, INSPECTOR OF MANUAL TRAINING AND HOUSEHOLD SCIENCE, DEPARTMENT OF EDUCATION

THERE are ninety manual training centres, and eighty household science centres, in the urban schools of the province. Each of the teachers at these centres instructs from two hundred to three hundred pupils from grades 5, 6, 7, and 8, per week, in varying from one and one half to two and one half hours. The curriculum provides, for the lower grades, lessons in handwork with various materials such as paper, cardboard, clay, raffia, etc. To assist in the establishment and maintenance of these schools liberal grants are given by the Department of Education.

Owing to various difficulties, the attention of the Department was, until the opening of the schools in September last, concentrated on the introduction of these practical subjects into the schools of towns and cities. The rural schools felt that their limited resources and accommodations made it impossible to provide for these subjects.

The Department, however, thinks that the rural schools constitute one of the most urgent educational problems of the province, and, seeing that forty-five per cent of the school population is enrolled in the rural schools, it is convinced that the rural schools should have, as far as it is possible to give them, the advantages of town and city schools.

PRACTICAL EFFORTS AT IMPROVEMENT

In order to promote the introduction of practical subjects, such as manual training and household science, into the rural schools, successful attempts have been made to remove the difficulties that existed. Substantial grants are now offered to assist school boards to purchase equipment, and equipments have been designed that take up but little space in the one-room school.

To assist teachers in this work, a manual, now in the hands of the printer, is being issued. It consists of twenty lessons in the care of the home, twenty lessons in sewing, and twenty lessons in cooking, and, in addition, contains chapters on household science without special equipment, and on the organization and management of the school lunch. Photographs and working drawings are given of the necessary equipment. It has been the aim to make this manual intensely practical, and nothing has been included that is not feasible in the average rural school.

For the past two years the instructions given in the normal schools has stressed the rural application of this work, and this year the summer schools in manual training and household science will devote their attention very largely to the requirements and possibilities of the rural schools.

ESPECIALLY FOR GIRLS

Owing to the necessity for the conservation of food and careful household management at the present time, the work for girls has received the greater attention.

The equipment that has been designed consists of a cabinet which contains a two or three-flame burner oil stove of the most improved pattern, and some of the larger cooking utensils, and a cupboard containing cups, saucers, bowls, and other serving dishes. The cabinet takes up a floor space of only four and a half feet by two feet, and the cupboard measures three feet by one foot three inches by four feet two inches. Another self-contained equipment only occupies a space of five feet by two feet seven inches by one foot eight inches. These equipments vary in cost from $40 to $75, according to the number and quality of the utensils they contain.

They can be provided almost entirely from the Government grant. When not in use all the utensils are covered, and in their designing the possibilities of the country school and the requirements of the rural home have been kept constantly in view.

In urban schools the children are able to go home to lunch, but in a large number of country schools this is not the case, and in many of them the composition of the lunch, and the conditions under which it is eaten, are conducive neither to sound physical development nor to effective mental work in the afternoon.

In the United States it was found that the percentage of physical defectives, as disclosed by the draft, was seven per cent higher from rural districts than from towns and cities. This may be attributable in part at least to the conditions under which the noon-day lunch is eaten. No statistics are available for Canada, but it is probable that somewhat the same conditions exist in our own province.

THE SCHOOL LUNCH

The average rural school lunch is wrapped in newspaper and packed in a tin box, or pushed in the pocket. It often tastes of the tin, and is flavoured with printer's ink, and, in addition, in the winter time it is badly frozen before the time arrives for its consumption. In winter, the pupils crowd around the stove to eat their lunches, and in summer they are often to be seen chasing around the yard with a dry sandwich in one hand, a stick in the other.

In order to remedy such conditions, the provision of one hot dish, such as a bowl of soup or a cup of cocoa, to supplement the cold box lunch, is advocated. This is not only a good thing in itself, but it affords an introduction to more formal lessons in household science. (The grants offered by the Department provide in a large measure the supplies necessary. In some cases the trustees contribute, and, in others, supplies are provided by the pupils.) It is not a difficult matter for the rural school child to bring a tomato, a potato, or an egg, and these contributions are combined. When properly organized, the lunch can be prepared without any appreciable loss of school time. The older girls, and boys too, take a delight in doing this work, and get some useful training while doing it. Where the school possesses a large table, it can be set, and the lunch eaten in an orderly manner, or each desk may be set as one unit at a table. In this way the lessons in manners may be given a decidedly practical turn. Lessons are also given on what the lunch box should contain, and the proper method of packing in order that it may have an attractive appearance, and thus appeal to the appetite.

In Saskatchewan, where this movement has been in existence for some time, there are 150 schools where the hot dish is served at noon, and the unanimous opinion of teachers, parents, and inspectors alike, is that the health of the children is improved, and that the afternoon work is made more effective. We have in Ontario at present 20 schools where this work is in progress, and in September many more will be started.

HOUSEHOLD SCIENCE LESSONS

Formal lessons in household science are generally given from three to four-thirty in the afternoon. In this way only one hour of the usual school time is taken, and it is found that the girls are perfectly willing to remain in school the extra time. The instruction given is kept closely to the needs of the home. Economy, conservation, prevention of waste, and the use of left overs, are urged. The pupils are encouraged to practise at home the work they do in the school. The co-operation of the parents is sought; their advice is asked as to the kind of work to be undertaken, and the connection between the home and the school kept as close as possible. The girls often give practical demonstrations of the work they are able to do by serving refreshments at social functions and meetings of the parents held at the school.

The household science does not consist of cooking only, but also includes lessons in cleaning, general household management, and sewing. The sewing is taught from the lowest grades, and for the older girls consists in the making and repairing of simple garments.

The immediate object aimed at is to instal this work in at least six schools in each inspectorate. These schools will then serve as object lessons, and from them the work should spread throughout the country.

ESPECIALLY FOR BOYS

Manual training for boys consists in teaching simple mechanical drawing, and of the use of tools in making articles for the farm and the farm home, such as feed troughs, hen coops, chicken houses, dog kennels, hen roosts, gates, milk stools, wall shelves, hat racks, foot stools, benches, towel rollers, etc. Mending, repairing, and the preservation of farm implements also receive attention. Locks are repaired, latches are mended, broken harness put into workable shape. The importance of keeping the material equipment of the farm in thorough working order is stressed, and all the work is connected with the requirements of actual life. A new scheme of grants in aid of this work has recently been devised, and it is hoped that they will lead to a rapid extension of the subject throughout the schools. A manual, well illustrated by drawings and photographs, will be prepared, giving full instructions to teachers regarding organization and methods of work, and this, it is hoped, will remove some of the natural hesitation now felt by teachers to take up this work.

Education of this type is both cultural and practical. It not only prepares for work on the farm and in the farm home, but vitalizes the curriculum, and lays the foundation for higher industrial and technical education. The inspector will give all the help possible to schools desiring to introduce these practical subjects, and is available at all times to confer with trustees and teachers, and to address organizations anxious to promote the introduction of these subjects and to make them directly applicable to the peculiar conditions of particuliar schools.

LENNOX AND ADDINGTON COUNTIES PIG CLUB

MR. G. B. Curran, Agricultural Representative in Lennox and Addington counties has introduced the pig club idea into his "Greater Hog Production" campaign. Fifty members have already been enrolled, and each supplied with two young pigs, one a pure-bred Yorkshire sow and the other a grade of either sex. The pairs of pigs are supplied at from six to eight weeks old for twenty dollars a pair. The pure-bred sow is registered for the member. The Merchants Bank is supplying the money to purchase the pigs at six per cent interest on the note of the boys and girls, endorsed by their parents. At each township fair competitions will be held between pigs raised in the township. It is intended also to hold a county exhibition in which club pigs will compete in a general class.

THE RULES OF THE CLUB

Following are the rules that govern the operations of the club:

1. Any boy or girl between the ages of 10 and 18 may become a member.

2. Each applicant will receive two pigs. The pure-bred Yorkshire Gilt must be retained for brooding purposes. The grade pig is to be sold before December 1st and the money used to pay the loan at the Merchant's Bank.

3. The child's parents must agree to furnish a suitable pig-pen and yard and to supply the child with a sufficient quantity of suitable foods to bring the pair of pigs to maturity.

4. Each member must care for his stock in person, and keep a record of the feed given and the pasture grazed. Where possible a record of the weight of each pig should be kept, weight when received, and at stated intervals, so as to determine the gains. Suitable forms will be supplied.

5. Each member, must, wherever possible, show at least one pig at the school fair, and it is expected the pigs will also be shown at township fairs and at a county pig fair at Napanee.

6. The members of the club must agree to study the instructions issued by the Ontario Department of Agriculture.

7. Each member must furnish the bank with a final report of the season's work, which will include the amount of food consumed, the gains in weight, cost of gain per pound, methods of handling and management.

8. The basis of awards will be:—

Class 1: Feeding and raising.
- (a) 50 points for the highest net profit per cwt.
- (b) 25 points for type and finish, this being done with the bacon hog score card.
- (c) 25 points for the best kept records and most comprehensive report.

Class 2: Exhibition.
Best registered Yorkshire Gilt.

SASKATCHEWAN

BOYS' AND GIRLS' CLUB WORK

MR. John G. Rayner, Director of Boys' and Girls' Clubs in connection with the Extension Department of the Saskatchewan College of Agriculture, in an address before the Homemakers' convention held from June 25th to 28th, 1918, sketched the history of the movement. He said it was a very encouraging feature that the movement had resulted in obtaining the consent of the banks to lend money to boys and girls to purchase contest supplies. He referred to the fact that the editor of an agricultural journal in the United States had lent one quarter of a million dollars to boys and girls on the only condition that the borrowers should join one of the state clubs. In no case, Mr Rayner said, had borrowers failed to fulfil their financial obligations.

Turning to the progress of the movement in Sastakchewan, after referring to his own appointment as Director of Boys' and Girls' Clubs work in Saskatchewan, Mr Rayner said:—

> No definite constitution, or set of rules and regulations, was formulated for the guidance of the work this year, in-as-much as it was thought that the work was of such importance that time should be taken to study the movement in other provinces, and to profit by the experience gained there before deciding on a definite policy. However, every encouragement was given any organization expressing a desire to carry on club work. The contests given special encouragement were pig and poultry raising and potato growing. These were specially

emphasized, for the reason that pork products were in urgent demand for military purposes; that poultry could be used as a substitute for the pork at home, as well as having many other virtues, and that potatoes are one of the most popular and nutritious vegetables that can be grown. Leaflets on the raising of each of these crops had been prepared and distributed to all points putting on contests, report forms for use with the same contests being also supplied.

Mr. Rayner referred to the call of the times, and suggested that if we did not pay for this war in lives and money in this generation, the children would have to pay for it in lives and money in the next, and with compound interest. "Why not give them, then," he said, "the organized opportunity now to help pay for the war, and in terms of the healthful employment of their abundant energy and enthusiasm, through the organization of club contests that will contribute something toward the war need. They can assist in two ways: first by increasing production through such projects as pig and poultry raising, grain growing, and gardening, and, secondly, they can conserve what is produced by canning. Hundreds of tons of good fruit and vegetables go to waste every year which might easily be saved by canning." He thought these two great avenues of service could not be too strongly emphasized, and went on to say:—

Apart from this important service, the educational value of the work is something of permanent worth, and we must not let the immediate war demands obscure the fact that the broad and ultimate object of this work is educational—is fitting our young people to live well rounded, efficient lives, in peace times as well as in times of war. This work is based on a principle of great educational worth. It is this—the elevation of the common duties of life, and farm life in particular, from drudgery to the dignity of craftsmanship. It does this because it provides for the free and natural expression of the inborn desires of the boy or girl. Such desires as the joy of ownership, the passion for creating something, the competitive instinct, the craving for responsibility, etc., briefly to own something, to compete with others in taking care of it, and bringing it as near perfection as possible, and to anticipate the fruits of this care and responsibilitiy and ownership. The point is often raised that the boys and girls on the farm have already too much to do, and do not in any case enjoy feeding pigs, chickens, hoeing potatoes, etc. This is because all the environment surrounding such work makes it a matter of drudgery. But introduce the elements already mentioned, and immediately the whole aspect is changed. Wherever these contests have been organized and animated by right motives, the children have rejoiced in their opportunities. One woman writes: 'There is no power on earth that can prevent my soul from holding converse with the angels, even though with my hands I feed the pigs'. We hear much about patriotism these days, but the only way to develop true patriotism in the youth of our land is to provide such an environment that they will enjoy and love and revere the life they are permitted to live in the country where they make their home.

"The union of Danish bacon factories averted a strike which threatened to stop the shipping between the Danish port of Esbjerg and Harwich, by which route most of the Danish bacon was shipped to England, as the dock labourers at Esbjerg intended to assist the stokers who stood out for higher wages by refusing to load the ships. The union arranged so that a sufficient number of co-operators from slaughter houses and dairies were ready to undertake the loading themselves, and when the dock labourers saw this they refused to go on strike."—*"Co-operation in Danish Agriculture", by Harold Faber.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications, and Notes

GREATER PRODUCTION ON INDIAN RESERVES

SUPPLIED BY DEPARTMENT OF INDIAN AFFAIRS

The Department of Indian Affairs has during the past few seasons been making a special effort to increase production on Indian reserves, and this policy has, on the whole, been very successful. During the present season the Department's greater production campaign has been even more vigorous and thorough than in the preceding years, and results of a substantial character are expected. The Department has given explicit and urgent instructions to its officers in all parts of the Dominion with regard to this work, and the Indian Agents are actively engaged in giving instruction and encouragement in agriculture to the Indians under their charge.

It is the policy of the Department to assist the Indians in the purchase of their seed grain, and this year greater assistance than usual has been afforded in order that a larger amount of land on each reserve might be cultivated. Wherever it is practicable, land which cannot be worked by the Indians themselves, has been leased to whites.

ACTIVITIES IN ONTARIO

In Ontario, the Department has employed Mr. R. H. Abraham, a graduate of the Ontario Agricultural College, as field agent since 1915. This officer travels from one reserve to another instructing and encouraging the Indians. This method has so far proven very beneficial to the farming Indians of Ontario. Standing crop competitions in corn and oats, and vegetable garden contests are organized each year on many of the reserves under the supervision of the field agent. The crops of Indian oats in Ontario are exceptionally good. Meetings on greater production have been held on many of the reserves in the province. A production club was organized on the Six Nations reserve, the purpose of which was to discover the requirements of the farmers with regard to seed and help, the amount of unplanted land, and the remaining amount suitable for planting. This club has done excellent work in encouraging greater production on the reserve, and last year the Six Nation Indians had the largest crop in their history.

The work conducted at the Indian schools forms an important and interesting feature of the Department's agricultural policy. Reports received indicate that at all the boarding and industrial schools largely increased areas are being cultivated this year. Practically every Indian day school in Ontario is cultivating a school garden. In the other provinces also, wherever the land is suitable, and there is available ground around the school, gardens have been prepared. In addition to assisting the greater production campaign, these school gardens provide excellent training for the pupils, which should encourage them to engage in agriculture later in life. In many cases the activity of the children in gardening stimulates the older Indians to cultivate their land. The Department has sanctioned the hiring of all boys over fifteen years of age who are not required on the school farms, to farmers in the neighbourhood of the various schools, and a considerable amount of agricultural labour has in this way been released.

A COMMISSIONER APPOINTED

The most notable departure in connection with the Department's policy with regard to greater production in the western provinces in the present year has been the appointment of Mr. W. M. Graham, Inspector of Indian Agencies for the South Saskatchewan Inspectorate, as Commissioner for the provinces of Manitoba, Alberta and Saskatchewan. The new Commissioner's duties include the making of arrangements with Indians for the leasing of reserve land that may be needed for grazing, for cultivation or other purposes, and for the compensation to be paid therefor; the formulation of a greater production policy for each reserve; the issuing of directions and instructions to inspectors, agents, and employees in furtherance of that policy; the making of necesary purchases and engagement or dismissal of any extra employees; the marketing of the yield of grain and live stock, &c., &c. The Commissioner has the sole management of this work, subject to the approval of the Superintendent General of Indian Affairs. This plan of organization is already giving every indication of success, and it is hoped that it will be the means of bringing large areas under cultivation, and the production of grain and meat supplies of great value. The following summary will give some idea of the work that is already being done under Mr. Graham's supervision:—

ALBERTA

Arrangements have been made to start two large farms on the Blackfoot reserve. One of these is located on the surrendered land south of the Bow river, and comprises about fifteen sections. The other is on that portion of the reserve that is situated north of the Bow river. This farm comprises three or four thousand acres of fine land. In addition to these two greater production farms, ten sections have been leased to whites for farming on this reserve at $5.00 per acre per annum, the applicants paying at the time of signing the lease one-tenth of the first year's rental, the balance to be paid in four equal annual instalments. Seven more sections have been spoken for at this figure, but initial payments have not yet been made. This will make a total rental so far of $54,000.

A greater production farm is being started on the Blood reserve. There are three large outfits working and five thousand acres broken. The Indians gave this land gratis. Fifty sections on this reserve have been leased for grazing. On this land will be raised and grazed 25,000 head of sheep and 2,000 head of cattle. In addition, there is a surrender of 9 sections of the reserve proper for five years. The land in question has been leased for approximately $28,000 per annum, which will leave a substantial surplus to meet expenses, so that the work can be carried on without any further assistance from the Government.

It is expected that 1,000 acres of new land will be put under cultivation by the Indians of the Edmonton agency. It is also intended to start a fourth farm in Northern Alberta, possibly in the Edmonton agency. In connection with this Alberta work, Mr. Graham has purchased seven large oil-pull engines capable of ploughing from twenty-two to twenty-eight acres a day, according to the nature of the soil. Competent engineers have been secured to run these engines.

In addition to the departmental farms, extensive arrangement was made to increase grain production by individual Indians. On the Blood and Blackfoot reserves about 4,000 acres have been ploughed by individual Indians.

SASKATCHEWAN

A greater production farm has been started on the Assiniboine agency to the south of Sintaluta. It is smaller than those in Muscowpetung and Crooked Lakes. Mr. Graham expects that 2,000 acres will be broken on this farm. Sixty brood sows have been placed on this agency. The Assiniboine Indians passed a resolution asking for $15,000 for steers and $3,000 for heifers.

A greater production farm has been started on the Crooked Lakes agency, north of Broadview. Around 5,000 acres have been broken on this farm. Sixty brood sows have also been placed on this agency. Temporary bunk-houses, cook-houses, blacksmith shops, and stables have been built.

A greater production farm has been started on the Muscowpetung reserve, which is sirtuated north of Peigan. A total approaching 5,000 acres has also been broken on this farm. Temporary bunk-houses, cook-houses and blacksmith shops and stables have been built.

The Indians of the Pasqua band requested authority to spend from their own funds $15,000 for steers for summer feeding and $10,000 on young heifers.

Six thousand acres have been leased for five years at the Touchwood agency at 20 cents per acre per annum. The Indians surrendered this land on condition that they received $500 at the time of signing the surrender and $500 at the expiration of the five years.

LIVE STOCK

Three hundred and eighty-four stockers and one hundred and fifty sows have been bought from the greater production funds. Thirty stockers and one hundred and nineteen heifers have been bought on account of the Indians themselves from their trust funds. The Commissioner is arranging for other purchases.

WHAT THE RURAL SCHOOL CAN DO

MRS. M. M. HOLMES AT UNITED FARM WOMEN'S CONVENTION, CALGARY, ALTA.

We speak of the rural school problem, but when we try to explain it we discover many problems which differ to such an extent in the various schools that one solution will not do for all. However, what has helped one will give a suggestion to others, since we are all working to the same end.

Let me tell you, then, what has been accomplished in one district, first, along the line of hot lunches. This is just a typical one-room school. You have seen them—with three windows on one side, three on the other, a hall at one end, a door leading outside, and—there you are.

From twenty to thirty children have been attending in grades one to nine, inclusive, their ages varying from six to sixteen. Each child brought a lunch. while the teacher's home was a five-minute walk from the building, where she could enjoy a hot dinner. This left the children alone during the noon hour and to know they were probably rushing around the room with a sandwich in one hand and a piece of cake in the other, devouring each in its turn, doing the whole thing in five minutes and having fifty-five more for all kinds of mischief, was bad enough: but the lunch itself, was worse. I do not mean to say the lunch brought from home was not good. It was. In most cases it was excellent. But lunches brought distances from one to five miles in the winter time are apt to be frozen.

In this school they were brought in and piled in their accustomed place—a shelf in the hall—where they remained frozen. Perhaps at recess they were brought in and put on the floor around the stove—an ordinary heater—and they usually remained frozen. Added to this was the fact that the only available drink was icy water, and I can safely say that, regardless of all laws of health, not much water was consumed.

A SERIOUS SITUATION

When you remember that to get to school in time a child has to get up while it is dark, and, in a good many cases, eat a hurried breakfast, not getting nearly enough for a growing child, then rush off to school; this, together with the cold lunch, makes the situation serious. At least, the teacher of this school looked at it this way and she decided to change matters. After talking over her plan with your secretary, Mrs. Barrett, who declared it feasible, she went to the school board with the request for a cupboard, a supply of cocoa, sugar, and enough cooking utensils to make the cocoa. This school board, when aroused to action, did things properly, and built a cupboard that a good many kitchens would be proud of. They also gave the teacher permission to buy the required articles.

To avoid antagonism in the parents, she proceeded cautiously, buying only a tea kettle, bowl, dishpan, enough white oilcloth to cover the desks, a number of cans of cocoa, and a bag of sugar. Each child brought a cup, saucer, and spoon, and took their turn in bringing milk. The girls in grades 5, 6 ,7 and 8 were taught to make cocoa, and at recess each day one girl, using the back desk covered with oilcloth for a table, would prepare enough cocoa to provide a cupful for each pupil present. This, when it had to be boiled on the school stove, was just ready at noon. Then one child would place an oilcloth on each desk, one would place cups, saucers, and spoons on the desks, one pass the cocoa and two more serve it. After the cocoa was poured, dishwater was put on to heat and, after lunch was finished two girls would wash dishes and put things in order. This went on during the months of that winter, but the next winter the teacher decided to have other hot dishes served, and, for the purpose of experimenting, she purchased the articles necessary to make different kinds of soup, and found they could be made at the school-house at a cost of about one cent a pupil, providing each pupil with a cupful. She approached the school board again, stating facts, and secured their permission to buy the material for the various hot dishes and to add to the cooking utensils, viz., a large stew kettle, a double boiler, a mixing spoon, soup ladle, can opener, a large knife, and a pan for draining dishes.

At a school fair held in the summer, the school earned a sum of money and out of this a two-burner oil stove was purchased for $8.00 and an oven for $4.50. The stove had been used a number of times and was gotten cheaper on that account. Both stove and oven could probably be bought for $15.00.

OPERATION OF THE PLAN

Under the new plan, the lunch was brought from home as usual, the hot dish being merely a supplement, making the rest more appetizing, and supplying that which had formerly been lacking. A number of dishes have been served. I will read to you a list of these soups: cream of pea, cream of tomato, corn soup, split pea soup, string bean soup, cream of cabbage soup, potato chowder, salt codfish chowder; rice and raisins, chocolate blanc mange, apple and tapioca pudding, and baked apples were also prepared. There are many other things which can be served at no greater cost.

The apples baked were brought by the pupils, wiped and cored and the cavities filled with sugar and cinnamon taken from the school cupboard.

To go back to the vegetables; the school of which I have been speaking is planning to raise enough vegetables next year to supply them the following winter for their lunches, and this is where the women of the district can give great assistance. The pupils and teachers can start the garden and care for it until vacation, when the pupils can care for it themselves. It is during vacation that peas and beans are ready to can, and some energetic woman can render two-fold service by having the girls at her home and teaching them how to can these vegetables. Then they are to be stored away, may be in a near-by cellar, and carried to school as they are needed. Some peas and beans could be allowed to ripen, picked and packed away by the children after school opens. Then, in a short time the corn is ready, and it can be canned, too, and after that the roots are ready to be dug, and if there is not some one near the school who would be willing to loan a corner of his cellar for them why couldn't provision be made for storing them at the school-house?

LESSONS THAT ARE LEARNED

There is much more to be gained by the use of a plan such as I have outlined than you would imagine. A school garden has a definite aim; seeds are planted and the plants are taken care of with more enthusiasm on the part of the pupils. Everything raised is saved to be used during the winter, thereby lessening the amount of canned goods consumed, and there we have an excellent lesson in thrift. Then, there is the preparing of the food; domestic science, if you like, and lastly, the good, hot, nourishing cup of hot soup. And that cup of soup works wonders; an orderly noon hour and an afternoon following in which the pupils can learn with greater ease are only two of the effects.

The work of the rural school is, to a certain extent, to prepare the pupils for high school, but what shall we do for those who cannot attend the higher schools? Beside the three r's, they need quantities of hand work, things that teach them to create other things. The rural school should fit them for farm life. The girls should be taught to decorate a house attractively, make their own clothes, and cook. Colour and harmony are taught in art. Sewing can be taught. If the teacher cannot sew, some woman, or may be several, would be willing to teach the girls, and domestic science may be correlated with school lunches.

I have proven to my satisfaction that there is ample time for such things without neglecting any of the subjects, and, best of all, you lose the old grind which was always so noticeable.

FEEDING GRAIN TO MILKING COWS WHILE ON PASTURE

The Board of Agriculture and Ministry of Food of Great Britain have laid down the rule that cows in milk, while on grass, shall receive no concentrated food before the beginning of August. This rule is based on the result of experiments carried out at different stations in Great Britain which indicate that while on good pasture no benefit is secured by the feeding of a concentrated ration. Writing on this subject in the Macdonald College magazine an authority gives the following results on feeding grain to milking cows of different breeds while on pasture:

JERSEYS AND GUERNSEYS

Produced	20	pounds of	milk daily	when fed	3	lb. grain.
"	25	"	"	"	4	"
"	30	"	"	"	5½	"
"	35	"	"	"	7	"
"	40	"	"	"	9	"

HOLSTEINS, AYRSHIRES AND SHORTHORNS

Produced	25	pounds of	milk daily	when fed	3	lb. grain.
"	30	"	"	"	4	"
"	35	"	"	"	5½	"
"	40	"	"	"	7	"
"	50	"	"	"	9	"

It is thus shown that it required six extra pounds of grain to produce twenty-five extra pounds of milk.

CREDIT ASSOCIATIONS

The law governing credit associations in Denmark grants certain valuable privileges and lays down certain conditions for obtaining them. In order to obtain these privileges the law requires the following conditions to be fulfilled:

> That before establishing an association borrowers must be registered for a joint amount of at least £55,500.
>
> That no member shall be granted a loan exceeding three-fifths of the value of his property fixed by assessment according to certain rules.
>
> That there must at no time be in circulation a larger amount of bonds issued by the association than the total amount of the members' mortgages deposited with the association.
>
> That members shall be jointly and severally responsible for the bonds issued by the association to the extent of the full assessed value of their property, provided they have obtained a loan equal to three-fifths of that value; and in the same ratio to the amount borrowed, if this constitutes a lesser fraction of the assessed value.
>
> That the members shall, besides interest on the loans, pay a suitable contribution towards the redemption of the bonds.
>
> That bonds shall not be issued to a lesser amount than £5, and shall bear interest.
>
> That the Board shall annually publish the balance sheet of the association, and shall each quarter send an abstract of the accounts to the Minister of the Interior.
>
> That the by-laws shall be altered only with the sanction of the Minister.

"Co-operation in Danish Agriculture", by Harold Faber, published by Longmans, Green & Co.

THE MANAGEMENT OF SCHOOL GARDENS

School gardens should be conceived of educationally as the outdoor laboratory of the science curriculum. When incorporated as a part of elementary science and high school science, school gardening should be placed in charge of a director, especially qualified for that service, or in smaller cities in charge of one of the school officials, who has special interest or equipment in that line.

The teachers of school gardening should, for the most part, be regular grade teachers, especially where the departmental plan of teaching is employed. Then the garden work is programmed in the same way that cooking, shopwork, and physical training are programmed. In any departmental plan the teacher who is assigned to a department will very soon become an expert in that line. She will teach it in addition to other branches even better than the special teacher who may not be a regular member of a given school faculty. It is best that the teacher of elementary science have charge of the garden work wherever possible. Whenever extra vacation time is required for the teacher's service, a bonus salary should be paid to the garden teacher.

The other details of management will adjust themselves naturally out of this initial plan.—*Outdoor Education,* June, 1918.

ASSOCIATIONS AND SOCIETIES

THE PROPOSED INTERNATIONAL LIVE STOCK SHOW

A further meeting of the organization committee of the proposed International Live Stock Show for Canada was held in Toronto on June 11th. Plans were submitted for proposed buildings to accommodate 800 beef cattle, 1,000 swine, 700 horses, 1,000 sheep, 600 dairy cattle, and 10,000 poultry, with a space of 175 feet by 250 feet for seeds, and another space 150 feet by 200 feet for dairy products. After discussion, in which it was suggested that the judging arena should be 106 feet by 220 feet, and that seating accommodation should be provided for 10,000 people, a sub-committee was agreed upon of representatives of the different breeds to report upon the matters of buildings and finances. The sub-committee is as follows: Heavy horses, E. C. H. Tisdale, Beaverton; light horses, George Pepper, Toronto; beef cattle, L. O. Clifford, Oshawa; dairy cattle, D. C. Flatt, Hamilton; dairy products, F. Herns, London; swine, J. E. Brethour, Burford; sheep, Jas. Douglas, Caledonia; seeds, W. J. Lennox, Toronto; along with the chairman, Mr. W. A. Dryden, Brooklin, the vice-chairman, Mr. W. W. Ballantyne, Stratford, and the Secretary, Professor G E. Day, Guelph.

CANADIAN COUNCIL OF AGRICULTURE

At a meeting of the Canadian Council of Agriculture held in Winnipeg, Man., July 8, Mr. Norman P. Lambert, of Winnipeg, was appointed permanent secretary in succession to Mr. R. Mackenzie, resigned.

BRITISH COLUMBIA WOMEN'S INSTITUTES

The Secretary of the Agricultural Department of British Columbia in his annual report regarding Women's Institutes, states that only one institute was organized during 1917. In 1915 there were 56 institutes with a membership of 2,994; in 1916, 60 institutes with a membership of 3,039; in 1917, 61 institutes wirh a membership of 2,754. Extraordinary efforts had been made by the institutes during the past year to raise funds for patriotic purposes. The total value of cash contributions exceeded $16,000, while some 21,000 articles were sent overseas. The average membership of the institutes was 45 as against 51 in 1916. Forty-one institutes held flower-shows as compared with 43 in 1916. The average cost of the institute had risen to $148.17 as against $104.28 the previous year, the total actual expenditure on the work for the calendar year for 1917 having been $8,742.03. The vote of $7,500 for Women's Institutes for the fiscal year ending March 21st, 1918, had been granted. A "Better Babies" contest was held in Victoria on August 1st and the usual programme and essay competitions were also held during the year. Prizes were given for the best average attendance at meetings.

NOVA SCOTIA DAIRYMEN'S ASSOCIATION BUTTER COMPETITION

The Dairymen's Association of Nova Scotia is conducting a butter competition for prizes to the total value of four hundred and ninety dollars. The rules and regulations require that all exhibits must be the production of the exhibitor; that creameries may compete under their own names; that the scale of points shall be: flavour, 45; body, grain, and texture, 25; colour, 15; salting, 10, and finish, 5; that three judges shall be engaged, and that in the case of two scores being equal the award shall be given to the highest in flavour; that no brand or other distinguishing mark will be allowed. A fourteen-pound box is to be shipped, as directed by telegram from the secretary of the association during each of the months of June, July, August, September, and October, and to arrive in Halifax within seventy-two hours after the telegram is despatched from Truro. It is recommended that the butter be salted at the rate of three quarters of an ounce to the pound. After the judging, the butter is to be disposed of in the best possible way.

CONVENTION OF QUEBEC HOMEMAKERS' CLUBS

At the annual convention of the Quebec Homemakers' Clubs held at Macdonald College June 12th and 13th, Mrs. N. Cameron Macfarlane, Demonstrator for Women's clubs, reported that there were now 37 homemakers' clubs in the province, with a membership of 750, and that their Red Cross work amounted in value to well over $4,000. The year of 1917-18 had been one of marked activity and progress for the clubs. The members were exerting every effort to do their share of the necessary war work, to become thoroughly acquainted with food and food preparation, sanitation, medical inspection, household financing, the school lunch and the better management of work in order to save time and energy. The studies with respect to foods had been well supplemented with practical demonstrations, that on canning being especially appreciated. The secretaries of the clubs had been placed on the mailing list of the Canada Food Board. Forty practical demonstrations on the making of meat and wheat substitutes were given to the Quebec Homemakers' clubs and other organizations by Miss Babb, Assistant Demonstrator. This year the club had planned a gardening campaign.

School fair work received more than its usual share of attention, many of the clubs assisting with the prize list and doing a great deal to encourage children to exhibit. The Macdonald College demonstrators for rural schools gave nearly four months of their time to this work. Sixty-eight practical demonstrations on bread making, cake making, and canning were given in the schools at various centres throughout the province. The work in Pontiac county had increased so rapidly that the demonstrators had had to encroach on time that should have been otherwise occupied. The total number of demonstrations and addresses given by the Household Science Extension Department to the clubs and schools was 140, by other members of the staff of the school of Household Science, 5, and by the School of Agriculture, 2.

The travelling libraries, established in October, 1914, had been called in and checked over. No books were missing and no damage done beyond that resulting from ordinary wear and tear. The library records showed that 520 books had been loaned to members. The libraries contained standard works on household science. The clubs at Stark's Corners and Wyman are starting libraries on their own account. The report suggested that increased efforts should be made to induce women to join clubs. It was advised that two meetings a year be devoted to subjects relating to education, that the men of the community be invited to attend, and that whenever possible leading educationalists be requested to address these meetings. Reports showed that there had been a great deal more co-operation between men and women in the rural work.

Owing to pressure of work due to war conditions, and the increase of school fair projects, no organization work could be planned by the demonstrators, and the five new clubs organized during the year owe their existence largely to the efforts of individual club officers and others interested in rural work. Time had shown that the homemaker had a large, distinct, and important part to play in deciding the issue of the great struggle in progress. "Here in our province", the report proceeded, "the homemakers' clubs were the first organizations to receive practical demonstrations of school lunches, one of the most important types of service, namely, conserving the health of the child; the canning of fruits and vegetables and the making of meat and wheat substitutes, the last named being put on even before the food pledge cards were issued". Every club was requested to make itself responsible for an organization meeting and to make arrangements for such as early as possible.

Resolutions were passed to the effect that the clubs make a more determined effort to work and study along the lines of their original object, in addition to Red Cross and other forms of patriotic work; that the members of the Quebec Homemakers' Clubs, in order to prepare themselves for their new responsibilities in respect to the franchise, should make a study of the lines relating to women and matters pertaining to civics and government; that further effort should be made to work and co-operate with the Cercles de Fermieres; that the school law of the province be amended so that women may sit on the school boards; that a federal bureau of health be established at Ottawa, and that the name "Demonstrator to the Quebec Homemakers' Clubs" be changed to "Director of Homemakers' Clubs".

SASKATCHEWAN STOCK GROWERS' ASSOCIATION

The sixth annual convention of the Saskatchewan Stock Growers' Association was held at Moose Jaw, June 12th and 13th. Resolutions were passed requesting the provincial Government to establish one or more assembling and sorting centres for live stock; that one of the assembling places should be established at Moose Jaw; that steps be taken to insure the conservation of coarse feed on farms until April 1st of each year; that the Canadian Northern Railway be extended westward from Bengough through districts that at present lack railway facilities; that the provincial Government be impressed with the importance of allowing live stock to run at large in all parts of the province after the completion of threshing, until May 1st of the following year; that the number of provincial police in the range areas be sufficiently increased, in view of the withdrawal of the Royal Northwest Mounted Police, to prevent cattle stealing.

It was decided that the next annual meeting should be held at Swift Current and the following officers were elected: President, Jack Byers, Valjean; vice-president, Olaf Olafson, Mortlach; secretary, Hugh McKellar, Moose Jaw, Saskatchewan.

SASKATCHEWAN HOMEMAKERS' CLUBS

The Homemakers' clubs of Saskatchewan met in annual convention at Saskatoon the week ending June 29th. The annual report of the director, Miss DeLury, states that the number of clubs reported in 1916-17 was 180. During the past year fifteen new organizations had joined, making in all 195 clubs. The Red Cross organization has penetrated into the remotest districts, even where women's organizations already existed, so that now almost always a new organization is likely to be a Red Cross society. Besides four or five of our organizations have disbanded to amalgamate with the Red Cross societies. During the year 49 organizations were visited and 25 short courses held.

Scarcely any club community that has need of such a thing as a rest room is now without one. In many cases, the rest room has developed into a sort of community centre, where social gatherings, lectures, debates, and so on can be held, and in many of them libraries and reading rooms are conducted.

The clubs still have their sixty free libraries, 47 of which are in circulation. With the assistance of the University grant, 24 community libraries have been established. The libraries are not confined to the Homemakers' clubs, but other women's societies are given the advantage of them. A number of the clubs have secured Government circulating libraries.

The problems of nursing and medical attendance and medical inspection of schools would seem to be solving themselves as rapidly as possible. The Department of Education is doing its part in organizing for medical inspection of schools, and, already in club communities, medical inspection of schools is getting to be general through the activities of the clubs.

The interest in, and work done for, our schools has been making wonderful progress. The individual drinking cup and towel and other sanitary measures for rural schools, that such a short time ago seemed unattainable, are now becoming general. So also with the school lunch, the idea of which was first launched in this province by the Homemakers, and has since continued to be one of their pet activities.

At least in four communities, there is a Homemaker on the school trustee board.

Last year, for war work, an approximation was made, based on the amount raised and a money valuation of the articles made, from the best estimate that could be made from the data presented, and from the number of clubs that reported. The sum of $23,790.08 was the amount raised, and, estimating that 160 clubs out of 180 were doing war work, the total would probably approximate $36,955.20.

This year a separation has been made between moneys and articles made. From 109 clubs reported this year, the sum of $3,308.78 was raised in cash, and the number of articles made totalled approximately 13,045.

STORY OF THE CLUBS

BY MRS. J. DRACAS, PAYNTON, SASK.

In a review of the work of the Homemakers' Clubs of Saskatchewan, I can give but a synoptical view of the growth of the clubs, and some of the subjects discussed at different conventions and their relationship to the home life.

Since every new movement has its origin in thought, it was a splendid idea that germinated in the mind of Dean Rutherford, who realized the need of some organization to supply a necessary recreation for the women that the agricultural society had done for the men, and the Homemakers' clubs were organized to supply that need under the Director of the Extension Department, College of Agriculture, in 1910. When meetings for the women were organized in connection with the agricultural societies along the main line of the C.P.R., east of Regina, representatives from these newly organized clubs met in convention in Regina on Jan. 31st to Feb. 3rd, 1911, at which the constitution was discussed and outlined.

In 1913, Miss DeLury was appointed Director of Homemakers' clubs for Saskatchewan, with Miss Harrison as assistant to act as lecturer and demonstrator. The latter's place has now been supplied by Miss Patrick.

The aims and ideals of the clubs have been to do everything in the best interest of home and community. In the working out of any great aim, there should be room for more than one form of expression. Each club was free to take upon itself the work that proved most necessary in the broadening interests of its particular community. This led to the establishing and maintaining of rest rooms and libraries, the development of district nursing, to medical inspection of schools, and to the study of domestic science, the last mentioned of which is of special importance at a time when we are expected to conserve all foods in compliance with food control. Regarding medical inspection of schools, it is our imperative duty to spend our best efforts in maintaining the health of the children.

The District Nurses have proved an inestimable blessing wherever they have been stationed, but in a number of districts where the nurses had offered their services for overseas, or had resigned to be married, it had been difficult to supply their places. There is no better way in which junior members could prove their patriotism, that is, those who are physically able to undergo the necessary medical examination, than by taking a professional nurse's training course. The war has opened the door to so many occupations for women that there is now no excuse for idleness on the part of anyone. It has proven that there is no sex in talent and no sex in endurance. No responsibility seems so great to the evolving womanhood of our country, both within the clubs and without, as the protection of our young people from the snares and pitfalls set for the innocent. However pure may be the atmosphere of the home, there still remain outside of it the problem of counteracting efforts to undermine the mother's influence. I would strongly recommend that all young people between the ages of fourteen and sixteen be retained as near home as possible. The franchise has created a subject that will be difficult to ignore in the future existence of women's clubs. In our hand-book of references we are quoted as non-sectarian, non-partisan. We are expected to study the laws of our province relating to women and children and as to citizenship. Seventy-five per cent of the female electorate are women who should have occasion to assist in making the reforms required to meet the needs of the present and future changing conditions, for there is a power that has lain dormant in the female mind for centuries that has not yet become sufficiently awakened for us to recognize our strength in supporting our homemakers' ideals, and in molding them into what we are aiming for.

ALBERTA LIVE STOCK ASSOCIATION

BULL SALE AT LACOMBE

At the annual bull sale held at Lacombe, by the Alberta Live Stock Associations, Calgary, 179 animals were sold. The following table shows the number of each breed, the total value, and the average prices received.:

	No.	*Value*	*Average.*
Aber. Angus...	20	$ 3,355.00	$167.75
Herefords.....	54	12,530.00	232.03
Shorthorns....	103	18,085.00	175.08
Red Polled....	2	280.00	140.00
Totals....	179	$34,250.00	$191.34

BRITISH COLUMBIA HOLSTEIN-FRIESIAN ASSOCIATION

The eight annual convention of the British Columbia branch of the Canadian Holstein-Friesian Association was held at Duncan, B.C., on June 20th. The principal speaker was the Honourable E. D. Barrow, Provincial Minister of Agriculture. A good deal of discussion took place on the productivity of the Holstein, after which the following officers were elected:—President, Dr. S. F. Tolmie, M.P.; 1st vice-president, J. M. Steeves; 2nd vice-president, J. F. Bishop; secretary-treasurer, P. H. Moore; superintendent of Colony Farm, Essondale, B.C.

NEW PUBLICATIONS

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

The proceedings of the Nova Scotia Entomological Society for 1917, have been published, by order of the Legislature, in a pamphlet of 96 pages. Reports of addresses are given by officers of the Dominion and Provincial Entomological services with a number of minute plates.

Two Important Vegetable Pests, by W. H. Brittain, Provincial Entomologist. This is an eight-page circular describing the potato stem borer and the zebra caterpillar, with illustrations and advice as to their control.

Dairymen's Association Annual Report. The report of the 5th annual convention of the Dairymen's Association of Nova Scotia, held at the Agricultural College, Truro, January 10th and 11th, 1918, published in pamphlet form, contains a verbatim report of the various addresses delivered, along with the report of the Superintendent of Dairying, as well as a detailed record of prize winners in the summer butter scoring competition and at the winter dairy exhibition.

NEW BRUNSWICK

Agricultural Report for the Province, 1917. This report makes a publication of 170 pages with numerous illustrations. It gives full details of the activities of the Department for the year, and devotes a large space to elementary agriculture and educational courses.

QUEBEC

How to Save Wheat and Meat. A pamphlet prepared by the inspectors of the school of Household Science, Macdonald College, gives forty tested recipes, by which, in the making thereof, wheat and meat can be saved.

ONTARIO

Fall Wheat Production. Under this title Bulletin No. 2, prepared by Henry G. Bell, B.S.A., has been issued by the Soil and Crop Improvement Bureau of the Canadian Fertilizer Association, with illustrations. Reasons are set forth for increased effort in wheat production and advice tendered as to methods to be pursued. Illustrations and diagrams add to the value of the bulletin.

Ontario Agricultural College, Forty-Third Annual Report. This report which contains a review of all the activities of the college, with statements of the results of experiments, makes a blue book of 72 pages. It also gives details of the work of the Macdonald Institute, along with financial reports covering every department of the college.

Mushrooms in Ontario, by R. E. Stone, Ph.D., Lecturer in Botany at the Ontario Agricultural College. This is a twenty-four page bulletin, No. 263, describing the common table and poisonous mushrooms of Ontario. Elaborate descriptions are given of the different types of mushroom with exact illustrations of the various species. Rules are given to be observed in gathering wild mushrooms and also recipes for the use of edible mushrooms.

MANITOBA

Agricultural College Calendar. The Manitoba Agricultural College Calendar for 1918 is out, and gives full particulars of all the classes in agriculture, home economics, special courses and extension work. The college terms extend from October 15th to December 25, 1918, and from January 4th to April 5th, 1919. Short Courses are to be held as follows: December 1918, cereal crops, (Brandon); January 1919, forage crops; February, creamery course, farmers' annual convention and short course, and stock judging and field crops short course; January 7th to March 7th, steam engineering short course; May and July, teachers' course in agriculture and school gardening; July, B.S.A. and home economics short course; August, Ministers' short course. The exact dates of these courses are to be announced later. Returned soldiers' courses in agriculture and engineering run throughout the year.

The Department of Botany of the Manitoba Agricultural College has issued a coloured poster ten inches by fourteen inches, warning against poison ivy and describing if for identification.

Professor V. W. Jackson of the Biological Department of the Manitoba Agricultural College has prepared for circulation three leaflets; one on "aquatic insects", another on "poplars and willows", and the third on "maple, oak, ash and elm". Each of the leaflets is of four pages and is plentifully illustrated.

ALBERTA

The A. S. A. magazine published by the students of the Alberta Schools of Agriculture contains articles by the Provincial Minister of Agriculture, the Chairman of the Canada Food Board, the President of the United Farmers of Alberta, the Dean of the College of Agriculture, Edmonton, and others, including Mrs. Earna Nelson, who took the full course in agriculture at Olds.

BRITISH COLUMBIA

A little book containing 250 War-Time Recipes has been prepared for circulation by Miss Lexa Denne, Instructor in Household Science, Victoria, B.C., Normal School, and adopted by the provincial section of the Canada Food Board. It is stated that the majority of the recipes have been tested by the Normal School students and used in demonstration classes.

Goat raising. Bulletin 64, issued by the Live Stock Branch of the Provincial Department of Agriculture, gives a complete history of goat raising with descriptions of the best known types of goats, and the care, treatment, and values of the different breeds, with illustrations. It is a bulletin of thirty-six pages.

MISCELLANEOUS

A copy of the New Zealand Official Year Book has reached the office of THE AGRICULTURAL GAZETTE. This is the twenty-sixth year of publication and the book is a compilation of upwards of eight hundred pages. It contains facts in statistical and descriptive form relating to every branch of the government. Its agricultural information is especially full.

Food Laws.—The Canada Food Board has issued a Manual of Orders-in-Council and Orders of the Board relating to the production, conservation, and distribution of food, revised up to June 22nd. The manual gives the constitution of the Canada Food Board and minute details of all the orders relating to licensing and other matters. The Board has also issued a series of little books which are being sold at five cents a copy containing recipes for making bread, cakes, and puddings; cooking vegetables; canning, drying, and storing fruit and vegetables, and cooking fish.

The Report of the Women's War Conference, held in Ottawa at the invitation of the war committee of the Cabinet from February 28th to March 2nd, 1918, recently issued, makes a blue book of forty-six pages.

Farmer's Account Book. The Commission of Conservation is responsible for this book. It is intended in a simple way for the convenience of the farmer, who wishes a general summary of his year's business without going very much into detail. Only a few entries are needed from time to time. The book will show what his farm is making for him or what it is paying him for his time and work.

The annual report of the United Farmers of Alberta for 1917 in its published form of 384 pages, gives a complete history of the organization as well as a verbatim report of the 10th annual convention held at Calgary, January 22nd to 25th, 1918.

Canadian National Records for Sheep. Volume 6 of these records has recently been issued. It includes the records of Shropshires from 15877 to 18959, Leicesters 10416 to 11956, Cotswolds 2644 to 2998, Oxford Downs 6012 to 8058, Lincolns 870 to 929, Dorset Horns 1285 to 1592, Suffolks 2598 to 2938, Hampshires 1294 to 1669, South Downs 1091 to 1349, Cheviots 387 to 475, Romneys 42 to 328. The volume also includes the report of the directors, constitution, and by-laws, rules of entry, list of members and valuable indices specially arranged for breeders and owners.

Holstein-Friesian Herd Book. The twenty-first volume of the Holstein-Friesian Herd Book has recently been issued. It gives the records of bulls from 29,551 to 33,525, and of cows from 46,104 to 54,150. It also contains a list of the members of the association, the constitution and by-laws, a verbatim report of the 35th annual meeting held in Toronto, February 6th and 7th, 1918, and copious indices.

NOTES

Mr. J. P. Sackville has resigned from his position as lecturer in Animal Husbandry at the Ontario Agricultural College and accepted the live stock editorship of the *Grain Growers' Guide*, Winnipeg, Man.

The Veterinary Director General reports four prosecutions under the Animal Contagious Diseases Act in Regina, Sask., for feeding garbage to hogs without a license. In three cases the fines were $15.00 and costs, and in the fourth case $5.00 and costs.

As a means of entertaining the delegates to the Western Canada Irrigation Convention held at Nelson, British Columbia, on July 24th, 25th, and 26th, the Nelson Horticultural Society arranged their annual flower show to be held on corresponding dates. The Society not only supplied roses and other flowers in profusion, but cherries also for the pleasure of the delegates.

The annual Live Stock Judging Contest between the provincial schools of agriculture was held at Calgary, Alta., on July 3rd. Three students were chosen from the senior class in each school to compete for a silver cup presented by a Hereford breeder of Crossfield, Alta. The Olds team won, with Claresholm second, and Vermilion third.

It is estimated by the president of the Montreal Cultivation Committee that the value of the vegetables grown in Montreal this year on vacant lots will approximate half a million dollars. There are 18,639 lots under cultivation, including 2,800 in Westmount, Outremont, Montreal West, Lachine, St. Lambert, and Verdun. It is the intention next year to petition the Quebec legislature to follow the Ontario policy and make possible the utilization for cultivation of all vacant lots.

Among the ladies who are taking special courses in agriculture at the Ontario Agricultural College with the teachers, are more than twenty-five teaching sisters from the various Roman Catholic convents in Eastern Ontario. They are from Hamilton, London, Windsor, Chatham, and other places, and are preparing themselves to teach agriculture in the convents. This is the first time these teaching sisters have attended the college.

Accompanied by the Commissioner of Agriculture for Australia, the Honourable H. P. Richardson, the recently appointed Minister of Agriculture for Ontario, Honourable George S. Henry, and the new Minister of Education for the province, Honourable and Rev. Dr. Cody, paid a visit to the Central school at Brampton on June 26th. They were welcomed by members of the school board and 600 children. A special object of interest was the school gardening, which had been conducted by Mr. J. W. Stark, the Agricultural Representative for Peel, who was heartily complimented on the success achieved. There are sixty school lots under cultivation by the pupils.

Mr. Thomas Shaw, Professor of Agriculture and Farm Manager of the Ontario Agricultural College from 1888 to 1893, died at St. Paul, Minnesota, on June 25th, at the age of seventy-five years. After leaving the Ontario Agricultural College, Professor Shaw became Professor of Animal Husbandry at the University of Minnesota, and subsequently took charge of the extension service of the Great Northern Railway. He was the author of a large number of agricultural books, including, "First Principles of Agriculture", "Weeds and Modes of Eradicating Them", "Forage Crops other than Grasses", "A Study of Breeds", "Animal Breeding", "Clovers and How to Grow Them", and "Feeding Farm Animals".

Five women cow-testers have recently been appointed by dairy agents of the United States Department of Agriculture, co-operating with the state agricultural colleges and the state dairymen's associations. One has been placed in Iowa and the other four are in Wisconsin, where the first woman cow-tester in the United States is now starting her second year of work. These women have received training in agricultural high schools, or have taken work in dairying at short courses and all of them have been in close touch with dairy work.

The war-garden movement has swept the west, according to the report of Mr. Fred Abraham, Chairman of the Home Garden and Vacant Lot Section of the Canada Food Board. "It has been a revelation and inspiration to see the growth of the vacant lot movement in Port Arthur, Fort William, Winnipeg, Brandon, Regina, Moose Jaw, Saskatoon, Edmonton, Calgary, Vancouver, Victoria, Nelson, and at smaller points," he writes. "There is now little occasion to educate people to its necessity. All those who can are gardening everywhere. Contrary to popular impression, war-gardening has not put market gardenmen out of business, but has, on the other hand, increased the demand for vegetables, due to the advertising the movement gives this form of diet." Mr. Abraham is advising the breaking of new ground this fall on the widest possible scale, without reference to the demand for lots, leaving such organization for the winter months.

The Demonstration Farm of the Canadian Pacific Railway Company recently sold at Alberta Stock Yards thirty steers rising two years old which brought the provincial record price for similar sales of $16.80 per hundred weight. They were mostly of Shorthorn and Hereford breed. The thirty steers sold for $6,903.12. Their cost from December 1st, 1916, to May 20th, 1918, including selling charges, commission and freight, was $4,450.89, the net profit being $2,452.23 or $81.74 per head.

The Canadian Problems Club of Winnipeg have adopted a memorandum to be forwarded to the different Governments of the Prairie Provinces, suggesting that the owner of each parcel of idle agricultural land shall be required on or before June 30th, 1919, to fix a selling price to be filed with the clerk of the municipality; that if the owner fail to fix the price the same shall be fixed by the Government; that the municipal clerks shall return their report of the price fixed to the municipal commissioner, who shall classify and print the same in pamphlet form ready for distribution not later than November 30th in each year; that the wild land tax shall be levied on the selling price instead of on assessments; that the price fixed shall hold from January 1st, 1920, until December 31st, 1921, and shall continue in force thereafter until changed by the owner, and that the Dominion Government, the Provincial Government, or any individual or corporation, shall have the right of purchase at the fixed selling price provided full payment be made in cash.

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July 3—The World's Wheat Situation, W. W. Swanson, Ph.D., Prof. of Political Economy, University of Saskatchewan, page 1089.
Hereford Bulls That Have Made History, Prof. A. A. Dowell, University of Alberta, page 1096.
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June 27—Harvest Prospects in Canada and the United States, Ernest H. Godfrey, F.S.S., page 1093.

July 4—Some of This Year's Corn Problems, T. G. Raynor, Dominion Seed Branch, page 1134.

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Dry Farming in Western Canada, Prof, John Bracken, page 1327, July 7, page 7.
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PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

250—The Agricultural Wealth of the New Hebrides.—LARGEAU, T., in the *Revue agricole, Organe de la Chambre d'Agriculture de la Nouvelle Calédonie,* No. 54, pp. 31-52. Noumea, 1917.

251—Gambusia affinis, a Small Fish Very Useful for the Destruction of Mosquito Larvae.—RAVERET-WATTEL, C., in the *Bulletin de la Société Nationale d'Acclimatation de France,* Year LXIV, No. 12, pp. 445-451. Paris, December, 1917.

Gambusia affinis Baird and Girard is a very small fish (the largest specimens rarely attain a length of 5 cm.) belonging to the family Cyprinodontidae, which closely resemble Cyprinidae in outward appearance, but are differentiated by several characters, notably the presence of teeth; many of them are ovoviviparous, as is the genus *Gambusia.*

The Gambusias are of no value as food, but are of great utility as their food consists almost wholely in mosquito larvae, of which they destroy great numbers. They are the best fish as destroyers of mosquitoes as they live at the surface of the water (whence the name of "top-minnows", given in the United States) and they can live in water so shallow as to be uninhabitable for other species; large numbers of this fish are often found in ponds where the mud is, at times, only covered by 3 cm. of water.

The fish breed easily, on account of their hardiness and the fact that, as they are born in an advanced state of development, they are less exposed to various dangers. Experiments made in New Jersey have shown that not only are they easy to breed, but they constitute a hitherto neglected means for controlling mosquitoes wherever the water is sufficiently warm.

252—The Digestibility of the Dasheen.—LANGWORTHY, C. F., and HOLMES, A. D., in *U. S. Department of Agriculture, Bulletin* No. 612, pp. 11. Washington, November, 8, 1917.

254—Studies and Investigations of the Imperial Institute, London.—*Bulletin of the Imperial Institute,* Vol. XV, No. 2, pp. 177-184, 198-270. London, April-June, 1917.

PRODUCTION AND USES OF RICE.—An article on the cultivation and preparation of rice was published in previous numbers of the *Bulletin of the Imperial Institute* (Vol. XI, p. 634, 1913; Vol. XII, p. 85, 1914), in which the varieties of rice, methods of cultivation and preparation, pests and diseases, were described and an account given of the production of this cereal in the British Empire. The article under review deals with the production and commercial movement of rice, especially in the British Empire, and the use of rice and its derivatives.

The production of rice, as shown by official estimates, for nearly all the rice growing countries is given in the appended table. The chief omission is China, for which figures are not available.

World's Production of Rice.

Country	Production (cleaned rice) tons	Country	Production (cleaned rice) tons
India*		Bokhara and Khiva**	40,000
British India (1916-17)	34,079,000	Persia*	250,000
Native States	1,000,000	Mesopotamia*	30,000
Ceylon** (1915)	172,000	Siam*	2,500,000
Malaya**		Dutch East Indies**	
Straits Settlements	35,000	Java and Madura (1914)	3,494,000
Federated Malay States (1913)	46,000	Sumatra, etc.	750,000
Kelantan	35,000	French Indo-China*	3,500,000
Perlis	7,000	Japan (1916)	8,177,000
British North Borneo** (1914-15)	9,800	Korea* (1916)	1,758,000
Hong Kong**	15,000	Formosa* (1914)	647,000
Fiji**	9,000	Philippines** (1915)	491,000
Egypt** (1914-15)	366,000	Madagascar*	450,000
Uganda**	100	United States** (1916)	520,600
Nyasaland (1916)	1,300	Mexico** (1914)	15,000
British Guiana* (1915)	41,000	Guatemala **(1916)	7,500
Trinidad**	1,700	Dutch Guiana** (1914)	3,000
Italy* (1916)	320,000	Ecuador** (1917)	15,000
Spain* (1916)	149,000	Peru** (1915-16)	40,000
Bulgaria** (1912)	3,000	Brazil*	250,000
Greece**	1,200	Argentina** (1916)	7,000
European Russia** (1913)	256		
Transcaucasia and Russian Turkestan** (1914)	170,000	*Approximate World's total (for countries listed)*	59,407,000

*Exporting countries, in which production exceeds consumption.

**Importing countries, in which consumption exceeds production. It is doubtful to which category the countries without any mark belong.

CROPS AND CULTIVATION

256—The Problem of Agricultural Meteorology (1).—Azzi, G., in *Bollettino del Ministero di Agricoltura, Industria e Commercio*, Series B., pp. 1-10. Rome, 1916, and in *Bolletino bimensuale della Societa Meteorelogica Italiana*, Series III, Vol. XXXV, Nos. 6-7-8, pp. 25-32; Nos. 9-10, pp. 39-42. Turin, 1917.

The principles necessary to the solution of problems of agricultural meteorology. Among the variations in the yields of crops those caused by atmospheric changes hold the first place. These changes are of far greater importance than those due, for example, to the use of fertilizers, to cultivation, etc. For this reason studies aiming at reducing the damage done by meteorological factors deserve the greatest attention. The author has drawn up a very detailed scheme which permits the damage caused by weather to be reduced with certainty, by favouring a more rational adaptation of the various crops to the climates of the different districts.

Three principles are required for the solution of problems of agricultural meteorology:—1) a knowledge of the critical period; 2) phenological maps; 3) weather charts.

Critical period.—From germination to harvest the plant undergoes great modifications which change its form and structure, so that its requirements, even with regard to the various meteorological factors, vary during the growing period.

The critical period with regard to "rain" is the interval, more or less long, of the growing period during which the plant has an absolute need of a certain minimum quantity of water. If, during the critical period, the total rainfall is below the minimum required for the normal growth of the plant, the harvest will be poor, even though there be abundant rain during the rest of the growing period, and, inversely, if during the critical period, the needs of the plant are satisfied, the harvest will be plentiful, even though the rainfall during the rest of the growing period be scarce and badly distributed.

The critical period of cereals falls during the twenty days preceding earing. If, at this moment, there is not sufficient rain to keep the moisture of the soil above a certain limit, the grain harvest will be seriously compromised.

What has been said for rain may be repeated for all the other factors. A plant may, therefore, have more than one critical period, those of rain, frost, temperature, clouds, etc. One or all of these periods may assert itself and assume importance according to the local conditions of the climate.

The necessity of a detailed physiological and meteorological examination is thus obvious when it is desired to ascertain with exactitude in each district the cause of a failure in the crops and the requisite remedies.

Phenological maps.—In a certain number of stations in different parts of Italy the average date is calculated when the

(1) For other articles on this subject see Bulletin of Foreign Agricultural Intelligence, February, March, April and May, 1916.

peach, for example, flowers, and the data obtained is marked on the map at points corresponding to the various stations. All the districts, in which flowering occurs in the the same decade are included in one zone and the various zones marked in different colours. This gives the phenological map of the flowering of the peach tree.

The critical periods referred to above always coincide with some phase of growth (flowering, earing, etc.), that is to say, to a moment when the plant undergoes great modifications which make it very sensitive to the lack of rain or to other unfavourable meteorological phenomena. Thus, at the flowering stage of fruit trees, a drop in the temperature, which at other moments of growth would have no effect, suffices to compromise seriously the fruit crop.

If the average date of the different stages in the growth of a plant (leafing, flowering, ripening of the fruit) are known, it is possible to determine the period of the year during which the plant is particularly sensitive to the harmful action of certain phenomena, or particularly exacting with regard to humidity, temperature, etc. Thus, if the average date of flowering of the peach tree at a station A is February 5, the critical period of that tree with respect to frost will be the first 10 days of February. The phenological maps, then, make it possible to determine the critical period. For each variety grown there should be as many phenological maps as there are important stages of growth in relation to weather. For cereals these are: 1) germination; 2) earing; 3) flowering; 4) ripening of the grain.

Weather charts.—In 1910, in the province of Bologna, there was no rain during the 20 days preceding earing, which took place on May 15; and the harvest was below the average by about 9½ cwt. per acre. On the other hand, there was abundant rain during the first half of April. By earlier sowing and the use of an earlier variety it would have been possible to bring the earing stage to April 25-30 so as to make the critical moisture period coincide with a more favourable meteorological moment. For this, however, it would be necessary to know at the end of October what the weather could be in spring. It is not possible to make a good weather forecast for more than 24 hours, or, at a maximum, 48; *the crops cannot, therefore, be adapted to the weather.* If, however, it is impossible to foretell in autumn what will be the atmospheric variations at Bologna and Sciacca (Sicily) during the second half of April, there is no doubt that drought is much more frequent and likely to occur during this period at Sciacca than at Bologna.

If the crops cannot be adapted to the weather, it is possible to adapt them to the climate, which represents the average weather and is expressed by a series of percentages of probability:—probability of frost, drought, storms, clouds, etc.

The author applies the term "dry decade" to a period of 10 days where the total rainfall does not exceed 5 mm. By calculating for a certain number of districts over a long period (a minimum of 20 years) the number of times a certain decade has been dry, and comparing these figures to 100, the probability of drought for this decade will be obtained. Assuming that, at the station A, the 2nd decade of July has been dry 15 times in 20 years, the probability of drought during this period at A will be 75%.

This percentage is marked on a map at the points corresponding to the different stations. All the points where the probability of drought is from 70 to 100% form one zone, in which drought is certain; those where this probability is from 30 to 70 % form a second zone, and those where it is from 0 to 30 % form a third zone where drought is very rare during the decade under consideration. The zones are marked in different colours. In this way a chart will be obtained for each decade which will enable the distribution of drought for a given period to be ascertained at a glance. Similar charts would be made for *frost* ("cold decade"), *clouds, storms and mist.*

AGRICULTURAL METEOROLOGY STATIONS. The critical period of a plant with regard to a meteorological factor may be restricted to one or two decades. Taking as example the Agricultural School of Imola where agricultural observations are made, and the nearest meteorological observatory that of Bologna, about 20 miles away, it may well happen that, during the critical period of moisture for wheat, a shower may fall at Bologna while the drought continues at Imola, or vice versa. A comparison between the phenological and biological data registered at the school and the meteorological data of the observatory, may, therefore, lead to erroneous conclusions. It is necessary that the biological and meteorological observations be carried out at the same time and place:—the agricultural meteorology station.

The author considers that an entirely new scheme is unnecessary, more especially as in no case should a new station of agricultural meteorology be built, use being made of those stations and agricultural schools already existing by supplying them with building, technical staff and experimental fields. Each station should have the following instruments:—

1) rain-gauge;
2) hygroscope;
3) maximum and minimum thermometers;
4) earth thermometers;
5) bore for taking samples of soil at different depths;
6) balance, oven, and accessories required for determining the moisture in the samples.

How many stations are necessary? Where environmental conditions are uniform, as in Russia, where similar topographical and climatic conditions prevail over long stretches, the number of stations may be relatively limited. On the contrary, in Italy (as in Greece), with the exception of the vally of the Po, wich is fairly uniform, the country varies greatly, even within limited zones, so that it would be necessary to have so many stations that the project becomes almost impossible.

Nevertheless, however variable the geographical distribution of meteorological phenomena harmful to crops may be, the nature and significance of the problems of agricultural meteorology remain the same. Thus, in northern Italy, the district in which wheat suffers from lodging includes all the Po valley, but in central and southern Italy, and in the mountain districts, the action of rain with wind is usually discontinuous, often disappearing entirely, without any regularity, in localities sheltered from the wind, according to the topography of the land. The problem, however, is the same in each case:—to create a wheat which is both resistant to lodging and a good producer. If it be assumed that wheat suffers from lodging in 200 stations, if in one of these a wheat with a resistant culm were produced, this type could be introduced with a great probability of success in all the other 199 stations, wherever they may be situated.

Agricultural research which aimed only at solving well-defined problems connected with analyses of agricultural meteorology could, therefore, be carried out in a relatively small number of stations if it were known at what points and to what extent a certain phenomenon is harmful to a given crop. The agricultural stations, and agricultural schools and institutes forming a network in all the civilized countries of the world could, if adequately fitted up, be used as agricultural meteorology stations. To this list might be added the thermo-hyetometric stations, convents, agents and directors of farms, etc., situated even in most distant lands, who could take observations and help to solve the important problems of agricultural geography and meteorology. Each first class station of agricultural meteorology (agricultural stations and schools), together with the second class stations (thermo-hyetometric) and points of observation (parishes, etc.) dependant on it, form a *fundamental principle of the system* (*network*).

TABLES OF GROWTH (*their meaning, construction and use in determining a critical period*).—The data obtained in the stations are collected and classified in tables of growth. Plants are modified during the passage from germination to ripening of the fruit, but the modifications which occur are neither gradual nor continuous. There are relatively short phases during which the plant is greatly modified (disappearance of certain organs and formation of new ones—); it then remains anatomically and physiologically stationary for a long period, till another phase takes place. There are, thus, *phases of growth* (flowering ,earing etc.) and *interphasal periods* or *subperiods* between two successive phases. It may be assumed that the structure and requirements of a plant remain constant throughout a sub-period.

This phenomenon may be represented by a discontinuous curve, composed, however, of elements almost parallel to the line of the x joined by almost parallel segments to the line y.

The growing period of cereals is divided in sub-periods as follows:—

1) from sowing till the seedling appears;
2) from this phase till winter interrupts growth;
3) from this interruption till growth restarts in spring;
4) from the restarting of growth to earing;
5) from earing to complete maturity.

For each of these sub-periods there is a special table —table of growth—in which are noted all the meteorological and phenological factors of the plant studied, as, for example:

Table IV.—Wheat. Station........ Year........

Fourth sub-period—From restarting of growth to earing

1) Variety..
2) Date when growth restarted in the whole field....
3) Remarks on tillering during the 4th sub-period....

By tillering is meant the emission of lateral shoots, which usually takes place in autumn, but which may occur in a cold, late spring, as is frequently found in the mountains.

4) Lengthening of internodes....................
   a) day when first observed in a few plants........
   b) day when observed for the majority of the plants..
5) Degree to which temperature, humidity, sun, etc., favour or inhibit the growth of the internodes.—......
6) Date of appearance of first ears..............
7) Date of earing of the majority of plants........
8) Development of this phase, whether uniform, rapid or slow....................................
9) Influence of weather on earing................
10) Duration of 4th sub-period..................
11) Note, during the 4th period:
   1) frosts..
   2) storms..
   3) drought.......................................
   4) clouds..
   5) other meteorological phenomena............

   Note, in each case:
   a) date and duration.......................
   b) intensity..................................
   c) damage, caused to plants..................
   d) effect on soil (washing, baking, cracking, etc)...
12) Degree to which the variety grown proved resistant to adverse meteorological factors (drought, lodging, excessive moisture, etc)...........................
13) Injury by disease or insect attacks............
14) Degree to which atmospheric variations favoured the appearance of disease or insects................
15) Cultivation of plot during the 4th, sub-period....

TABLE I.—*Moisture of soil, height of plants and depth of roots.*

Month and day	Moisture of soil (%)			Date of last rain before taking of sample	Depth of roots, inches	Height of plant, inches
	Active layer	Virgin layer	Subsoil			

Soil moisture.—The periodical determination of the soil moisture at different depths is of great interest, increasing with the frequency with which the determinations are made. However, in view of the amount of work required it is best to allow the directors of the various first class agricultural meteorology stations to decide for themselves the frequency with which such determinations shall be made.

Besides the periodical determinations the soil moisture must be taken at two moments—15 days before earing, and at the beginning of this phase.

Height of plants.—The height of the plants before earing is measured from the level of the ground to the base of the highest leaf, and after earing from the level of the ground to the tip of the ear. The day the one method is replaced by the other account must be taken of the two factors bearing on the height of the plant calculated from the ground level to the base of the highest leaf on one hand, to the tip of the ear on the other, as, for example,

$$\frac{(72\ \text{Stem}).}{(76\ \text{Ear}).}$$

The average height of 10 normal plants taken haphazard here and there represents the average height of all the plants.

Depth of roots.—A lump of soil, together with all the plants on it, is raised about 6 inches, and the depth measured on the vertical section. This determination is made 3 times:—1) when growth restarts; 2) 15 days before earing; 3) at the moment of earing.

TABLE II.—*Number of plants and culms; vigour of tillering; average weight of dry mass of plants: number and weight of weeds.*

Month and day	Grasses Studied									Weeds	
	Number of plants with						Total number of culms	Weight in grams of dry seedling	Vigour of tillering	Number of samples	Weight in grams in dry condition
	one culm	two culms	three culms	four culms	many culms	Total number of plants					

N.B.—This table must be filled in at the moment when the internodes begin to lengthen.

1) *Vigour of tillering.*—This is calculated by dividing the total number of culms by the number of plants.

2) *Determination of the weight of the plants and weeds.*—In four different parts of the plot the plants are uprooted from about ¼ sq. yard; the weeds are separated from the plant studied; the root system is removed and the green part left to dry; when a constant weight is obtained the value is entered in the table.

TABLE III.—*Number of plants and culms; vigour of tillering; vigour of earing; weight of dried mass of the plants; number and weight of weeds.*

Month and day	Grasses studied											Weeds	
	Number of plants with						Number of culms			Weight in grams of dried plants	Vigour of tillering	Number of plants	Weight in grams in dry condition
	one culm	two culms	three culms	four culms	many culms	Total number of plants	plants earing	plants not earing	Total				

N.B.—This table must be filled in at the end of the earing stage.

TABLE IV.

Month	Meteorological observatory													
	Air Temperature							With wet-bulb thermometer			Percentage of relative humidity			
	7h.	13h.	21h.	Total	Average	Maximum	Minimum	7h.	13h.	24h.	7h.	13h.	21h.	Average

TABLE V.—*Temperature of Soil.*

Date	At the surface				In active layer				In virgin layer				In sub-soil			
	7h.	13h.	21h.	Average	7h.	13h.	21h.	Average	7h.	13h.	21h.	Average	7h.	13h.	21h.	Average

TABLE VI.

Date	Rain		Mist				Clouds	Storms	Other meteorological phenomena
	in inches (or mm.)	duration	7h.	13h.	21h.	Average			

The table of growth (composed of the above tables) is reproduced because it contains all the material necessary to a complete study of agricultural meteorology. For each variety there will be a table of growth corresponding to each of the interphasal periods.

DETERMINATION OF THE CRITICAL PERIOD—The yield in fruit is the measure by which the more or less favourable action of meteorological phenomena must be judged. The higher the yield the more favourable was the weather during the growing period in general and the critical periods in particular. If the data concerning wheat at station A from 1901 to 1910 were available the following facts could be deduced:—there is no relation between total precipitation and yield in grain or between yield and total precipitation during the 1st, 2nd and 3rd sub-periods. If, however, the data on the yield and total rainfall during the 4th sub-period are compared, a direct relationship is seen to exist. The critical rain period of wheat is, then, the 4th sub-period.

By limiting in this way the field of research to a relatively narrow scope it is easy to define exactly a critical period. No important phenological action is observed between the restarting of growth and the earing phase. The critical period, then, is the earing phase. At this moment the plant does the greatest amount of work by elaborating the enormous quantity of plastic substances necessary for the formation and development of the caryopses and by consuming a great amount of water. There is an average of about 40 days between the earing and ripening phases. During this time occurs the whole process of growth, the last phases succeeding each other rapidly—flowering, development and ripening of the caryopses.

To assure a good wheat harvest abundant rain is necessary during the decade, or two decades, preceding earing so that the plant may have the moisture necessary for rapid and strong growth. In warm countries, where there is a great probability of drought during the earing period, the critical period just mentioned is very evident and has a marked influence on the harvest. In proportion as the cold northern countries where rain is nearly always plentiful at the requisite time are approached, all relation between precipitation and yield disappears, while other critical periods arise, as, for example, an inverse relation between yield and rain during flowering.

The specific action of all the other meteorological factors could be established in a similar way.

THE MANNER IN WHICH KNOWLEDGE OF THE CRITICAL PERIOD, PHENOLOGICAL MAPS AND WEATHER CHARTS PERMITS AN INCREASE OF YIELD BY ADAPTING THE VARIOUS CEREALS TO THE CLIMATE.—When a scale of the yields has been established (*e. g.* for wheat, cwt. of grain per acre), it is possible to distinguish the zones of good, medium and bad harvests. Thus, the zone of good harvests includes districts where the average yield of wheat exceeds 13 cwt. per acre, that of poor harvests where the yield is less than 9½ cwt. per acre; the medium zone includes the districts with yields between 9½ and 13 cwt.

The aim of agricultural meteorology is to increase the zone of good harvests at the expense of the other two. Statistics are but a statement of facts; the expression "bad harvest" merely means that the meteorological factors during the period of growth in general and the critical periods in particular are unfavourable to the growth of the plant, but does not show which was the unfavourable factor or the means to remedy it. To do this agricultural meteorological analysis is necessary. Many meteorological phenomena may damage wheat, for example, in Italy. In the south there may be:—

1) warm, dry winds (sirocco, "favonio") which, during the ripening of the ear (5th sub-period) cause scorching, followed by hastened ripening, drying up of the grain, and, while the plants are still strong, the caryopses lose food material or do not form at all. This is particularly serious in light soils or where there is only a small layer capable of being cultivated and, in some years, within a few days, the yield is reduced by 25, 30, or even 50%;

2) lack of rain during the 10 or 20 days preceding earing.

3) prolonged drought during the period following sowing.

Rust is little to be feared because excessive humidity in spring occurs rarely and only over very limited areas. Lodging is unknown because in the islands, most of Calabria and in Basilicata hard and semihard grain with short, strong straw is grown.

In central and northern Italy, on the contrary, the following facts must be noted with regard to climate:—

1) in the valley of the Po, particularly in the lowest part, wheat almost invariably suffers from excessive moisture which causes rust with a resultant serious decrease of yield;

2) lodging caused by wind and heavy rain at the time of the formation and development of the caryopses may lower the yield by 20 to 25%;

3) considerable damage by late spring frosts.

Such is the knowledge, relatively general, at the present day, when the network of agricultural meteorological stations is to begin its work, aiming at *a*) the determination of the critical period of wheat with respect to the meteorological factors as discussed above, *b*) the preparation of phenological maps, and *c*) weather charts.

Once the critical period is known the comparison of the phenological maps and weather charts allows the suitability of a plant to local climatic conditions to be easily determined. If, for example, at A wheat ears on May 10 on an average, and if, during the last decade of April and the first decade of May, the probability of drought is 75 and 90 % respectively, this will show why the average yields in this district are relatively low. Once the reason of the poorness of the yield is established it may be remedied in three ways:

1) Change the time of the critical period phase and make it coincide with a more favourable meteorological moment.

E. g. the *f* variety of wheat at the station A ears on an average (see phenological map of earing of wheat) on May 12, and the probability of drought during the third decade of April and the first decade of May is 90 and 95 % respectively (see weather charts for drought for the 3rd decade of April and the 1st decade of May). This accounts for a low yield. In the first and second decade of April, on the contrary, the probability of drought at A drops to 10 and 15 % respectively. By earlier sowing or by using an earlier type of *f* wheat, so that earing takes place between April 20 and 25, this drawback could be remedied in part at least.

2) Artificial modification, during the critical period, of meteorological factors, *e, g,* control of frost by smoke, of drought by irrigation, etc. Brilliant results have been obtained with fruit in California by forecasting cold by 24 to 48 hours, thus allowing growers to decrease or even nullify injurious effects by burning heavy oils or other substances which surround the trees with thick, protective smoke.

3) The introduction or production of types of increasing resistance to drought frost, rust, lodging, etc.

Modern experimental research in biology in various countries has clearly shown that, by hybridization and subsequent selection, it is possible to unite in one variety the good characters existing in two distinct varieties and to eliminate undesirable characters. In each particular case the breeder must aim at uniting high yield with resistance to the harmful meteorological character most frequent in the district. Thus, at Svalof (Sweden), M. Nilsson has obtained types of wheat resistant to cold, and at the same time, excellent yielders by crossing the most productive varieties slightly resistant to cold (English Squarehead) with native Swedish wheat very resistant to low temperatures.

This acclimatixation of non-native types and creation of new types by crossing and selection would be the most important work of agricultural meteorological stations of the 1st class. In the choice of these, therefore, use would be made of agronomic and agricultural Institutes already existing and not of the meteorological Institutes which may cooperate with them but cannot form centres for new research.

The following example shows that agricultural meteorological study is not only necessary where soil is cultivated for the first time, but that it may give excellent results in districts where intensive culture has been carried out for a long time by determining a better adaptation of crops to the climate of different districts. In the province of Bologna (northern Italy) each farm may be said to grow three varieties wheat—Rieti, Gentil rosso and Hybride inversable de Vilmorin, distinguished by the following characters:

1) Rieti: resistant to rust but lodges easily; in favourable years, *i. e.* when it does not lodge as a result of storms, it yields about 17½ cwt. per acre;

2) Gentil rosso: very subject to rust and lodging; in favourable years, without excessive humidity and destructive storms, it may yield over 19 cwt. per acre;

3) Hybride inversable de Vilmorin: subject to rust but resistant to lodging; when the humidity is not excessive it may yield 16¾ cwt. per acre.

Gentil rosso and Hybride inversable are of recent introduction, and other varieties, now under observation in various agricultural institutes, will finally be added to the pre-existing varieties, causing a mixture of wheat which is not always desirable. A single variety best suited to the climate had not been adopted because, it is argued, there is no such variety and none which suffers from the same two causes at the same time, therefore, if in any year one variety fails, there is always one which succeeds, thus compensating for the loss. This is false reasoning, Gentil rosso, when it does not lodge, produces up to 19 cwt. per acre, Hybride inversable only 16¾, *i. e.* 2¼ less; but the first lodges easily, whereas the second does not. Lodging causes a loss of nearly 4 cwt. per acre, thus reducing the yield from 19 to 15 cwt. The probability of heavy rainfall and wind during the 5th sub-period in the province of Bologna is, moreover, 80 %. In a period of 5 years there would be:—Gentil rosso 19 + (15x4) = 79 cwt; Hybride inversable de Vilmorin 16¾ × 5 = 83 ¾. Thus, in the province of Bologna, where the probability of lodging is 80%, the Vilmorin hybrid is preferable to Gentil rosso.

When, on the contrary, the probability of storms in the 5th sub-period falls to 20%, Gentil rosso should be preferred:—Hybride de Vilmorin 16¾ × 5 = 83¾; Gentil rosso (19x4) + 15 = 89 cwt.

Agricultural meteorology is, therefore, indispensable if an exact idea of the real productivity of a species in a given district is to be determined.

The mere fact that a given variety of wheat is grown by preference in a given district is no proof that it is the best suited to this district. New types are often on the market which may completely supersede the native types, to be superseded later in their turn by other new types. In all such cases it is the character "productivity" which guides the farmer in his choice of seed; but productivity is influenced to a marked degree by climatic conditions, and consequently, varies from one district to another, so that the adoption of new types should be preceded by a careful study of agricultural meteorology.

Agricultural meteorology thus gives a two-fold result:—

1) it allows a better distribution of the different varieties of a cultivated species; *i. e.* it shows the districts best suited to each variety from the point of view of local climatic conditions;

2) it guides the selector in his research aiming at uniting to the best advantage in a single type, productivity and resistance to the most destructive meteorological phenomena of the different districts.

The work of adapting crops to climate is difficult, but it cannot fail to lead, in part at least, to positive results, and considering the size and complexity of the problem, these results, even though they be but small, represent large figures.

Unfavourable conditions in Italy diminish the grain harvest, on an average, by over 3 cwt. per acre, and though only ½ cwt. per acre were gained, the profit would be 9,432,980 cwt., representing a considerable value.

What has been said for wheat applies equally to all other cultivated plants; what has been said for Italy applies to all the countries of the world. On the other hand, it is seen that the network of agricultural meteorology stations is already outlined by the many agricultural schools and institutes and the thermo-hyetometric stations possessing the premises, instruments, experiment fields and technical staff. All that is required is to collect, co-ordinate and develop all this latent or dispersed activity, so that the cost of the formation and upkeep of the new service shall be limited.

257—The Relation of Winter Temperature to the Distribution of Winter and Spring Grain in the United States; Why Cereals Winterkill.—SALMON, S. C. I., *Journal of the Ameriacn Society of Agronomy* Vol. IX, No. 8, pp. 353-380; II. *Ibid.*, Vol. IX, No. 1, pp. 21-24. Washington, 1917.

I.—In northern districts winter cereals usually give a higher yield than spring cereals, but they are much less widely distributed because they are naturally excluded from zones where the climate is too severe to allow the young plants to survive the winter. The injurious action of the winter may have four effects:—

1) HEAVING.—This is due to expansion and contraction of the soil by alternate freezing and thawing; the roots are broken and exposed to the air. Shallow sown plants suffer least, as the whole plant will then be lifted without breaking of the underground parts. Heaving is most common in the eastern States, especially in wet, badly drained plains.

2) SMOTHERING.—Alternate freezing and thawing sometimes turn the snow into an ice sheet through which the air cannot pass, thus suffocating the plants by lack of air and accumulation of carbonic acid.

3) PHYSIOLOGICAL DROUGHT.—This occurs when the soil is frozen and the plant can no longer obtain moisture from it. All the anatomical characters which tend to limit transpiration should, therefore, be in correlation with resistance to cold. Turkey and Kharkov wheat, winter rye and winter Turf oats, known for their resistance to cold have marked xerophytic structures—narrow leaves and prostrate habit of growth, which partially protect the plant from the action of wind (Kolkunow, Sinz, etc.). The author and his collaborators in a study on several varieties of winter wheat, rye, barley and oats, found no definite relation between resistance to cold, cell structure, epidermal covering and ability to control transpiration. Recent studies have, however, shown that a reduction of the leaf area in relation to the length of the root as expressed by the ratio of root length to leaf area does influence the resistance of young plants to cold. In Turkey wheat this ratio is 25 % greater than in Fultz wheat, a less hardy variety, and 40% greater than in common oats and barley. Physiological drought may be considered, if not as the only cause of winterkilling, at least as the most important.

4) DIRECT EFFECT OF LOW TEMPERATURE.—This acts in many ways:—

a) Mechanical action.—Injury to the tissues caused by the formation of ice.

b) Desiccation of the protoplasm.—Low temperatures cause withdrawal of water to the intercellular spaces, where it freezes; when later, the ice thaws rapidly the moisture can no longer be absorbed. At—13 C. (+8.6°F) the loss of water is 63.7%; at—15.2°C. (+4.6°F.) 79.2%.

c) Coagulation of the proteids.—In plants resistant to cold this only takes place at very low temperatures; thus for pine needles a temperature of —40°C. (—40°F.) is required, in winter rye —15°C.) (+5°F.) and in begonia, which is very sensitive to cold, —3°C. (+26.6°F.) This coagulation is accompanied by denaturing of the proteids, caused, perhaps, by increased acidity of the sap, so that they can no longer be reabsorbed. This theory is held by Gorke but contradicted by Chandler's experiments, which showed zinc sulphate, one of the salts which readily coagulate proteids, to increase rather than to diminish resistance to cold.

Lidforss, in his studies on *Holosteum, Cerastium, Lamium, Veronica, Senecio, Viola, Fumaria*, etc., observed that, on the approach of winter, the starch in the tissues of these plants changed to sugar, which, by changing the concentration of the sap, reduces the freezing point. These phenomena of the protective action of various substances due to the lowering of the freezing point have formed the subject of much research (Maximov, etc.), which confirms the theory of Lidforss.

II.—The specific action of low winter temperatures on winter cereals is clearly shown by a study comparing the northern boundary of different varieties with the isotherms of the minimum temperatures during January and February.

WINTER WHEAT.—Its northern limit corresponds approximately to the isotherm of 10°F. (—12.2°C.). Cold resistant varieties may exceed this limit if the seed is well protected by a covering of snow.

WINTER BARLEY.—Its northern limit coincides with the isotherm of 20°F. (—6. 6° C.) It is successfully grown to the west of the Rocky Mountains and to the south of the Ohio and Platte rivers.

WINTER OATS.—Its northern limit corresponds to the isotherm of 30°F. (—1.1°C). They may be grown, in the north, as far as Central Tennessee and Arkansas and southern Maryland and Oklahoma.

259—The Proof of Microbial Agency in the Chemical Transformations of Soil.—CONN, H. J., in *Science*, Vol. XLVI, No. 1185, pp. 252-255. Lancaster, Pa., Sept. 14, 1917.

260—The Decomposition of Soil Protein Substances Through the Action of Bacteria.—ROBINSON, R. H., and TARTAR, H. V., in *The Journal of Biological Chemistry*, Vol. XXX, No. 1, pp. 135-144. Baltimore, May, 1917.

261—Irrigation of Orchards in U.S.A.—FORTIER, SAMUEL, in *U. S. Department of Agriculture, Farmers' Bulletin* No. 882, pp. 40, Washington, D.C., October, 1917. (2 pp. in Institute Bulletin).

264—Fermentation of Manure Treated with Sulphur and Sulphates: Changes in Nitrogen and Phosphorus Content.—AMES, J. W., and RICHMOND, T. E., in *Soil Science*, Vol. IV, No. 1, pp. 79-89, bibliography of 21 publications. Baltimore, July, 1917.

265—**Garbage Tankage, its Composition; The Availability of its Nitrogen and its Use as a Fertilizer.**—SCHROEDER, P. J., in *The Journal of Industrial and Engineering Chemistry*, Vol. IX, No. 5, pp. 513-518. Easton, Pa., May, 1917. (2 pp. in Institute Bulletin).

271—**Influence of Position of Grain in the Cob on the Growth of Maize Seedlings.**—HALSTED, BYRON D., and OWEN, EARLE, J., in the *Journal of the American Society of Agronomy*, Vol. IX, No. 6, pp. 267-275. Washington, D.C., September 25, 1917. (3 pp. in Institute Bulletin).

274—**Experiments in Field Technic in Rod Row Tests**—HAYES, H. K., and ARNY, A. C., in the *Journal of Agricultural Research*, Vol. XI, No. 9, pp. 399-419. Washington, November 26, 1917. (3 pp. in Institute Bulletin).

276—**A Method for Determining the Percentage of Self-Pollination in Maize.**—WALLER, A. E., in the *Journal of the American Society of Agronomy*, Vol. IX, No. 1, pp. 35-37. Lancaster, Pa., January, 1917.

282—**The Selection of Some Varieties of Swede Resistant to Plasmodiophora Brassicae, in Denmark.**—CHRISTENSON, C. I., in *Tidskrift for Planteavl*, Vol. XXVI, Part I, pp. 68-82. Copenhagen, 1917. (3 pp. in Bulletin Institute).

283—**Flaxwilt: A Study of the Nature and Inheritance of Wilt Resistance.**—TISDALE, W. H., in the *Journal of Agricultural Research*, Vol. XI, No. 11, pp. 573-605. Washington, December 10, 1917. (2 pp. in Institute Bulletin).

289—**Some Effects of the Successive Cropping of Barley.**—GERICKE, W. F., in the *Journal of the American Society of Agronomy*, Vol. IX, No. 7, pp. 325-332. Washington, D.C., October, 1917. (2 pp. in Institute Bulletin).

299—**Raspberry Culture.**—DARROW, GEORGE M., in the *U. S. Department of Agriculture, Farmer's Bulletin 887*, pp. 44, bibliography. Washington, October, 1917.

In the United States the raspberry is grown, not only in small plantations for the home and local market, but, in some districts, as the principal commercial crop. Statistics show that, in 1909, there were 48,668 acres of raspberries in the United States.

The methods of cultivation on estates which specialize in raspberries are very progresssive. Detailed information is given on:—choice of plantation; preparation of the land; planting (there are 3 methods of planting—1) the hill system, in which a horse cultivator is used on all sides of the plant; 2) linear; 3) hedges, where the cultivator is used in one direction only); manuring (an average of 10 tons per acre of stable manure, leguminous cover crops to be dug in as green manure); training and pruning; winter protection.

LIVE STOCK AND BREEDING

304—**Screw-Worms and other Maggots Affecting Animals.**—BISHOP, F. C., MITCHELL, J. D., and PARMAN, D. C., in *U. S. Department of Agriculture, Farmer's Bulletin* 857, pp. 20, Washington, September, 1917.

The screw-worm (*Chrysomyia macellaria* Fabricius) is a native of America, and is found from the extreme south to Canada, but is rarely abundant in the Northern States, as the fly is quickly killed in cold weather. The states of North America which suffer most severely are Texas, Oklahoma, New Mexico, Arizona and Southern California.

Practically all animals are attacked by this insect. Probably cattle suffer most; hogs, horses, mules, sheep, goats and dogs follow in the order named. Wild deer (*Cariacus* sp.) and many of the smaller mammals are sometimes seriously infested. Human beings are also frequently attacked. The female lays its eggs in wounds or skin injuries, where the parasite remains throughout the larval stage. The pupa is usually found in the ground. A huge number of eggs may be deposited in a mass by a number of females. In livestock the parasite always causes loss of appetite and emaciation, and sometimes death. In some districts it makes calf-rearing almost impossible (the fly lays its eggs in the naval of the new-born calf, often causing its death) and older cattle have to be bought elsewhere. In sheep it causes emaciation and decreased milk production, and in all cases involves increased expenses for the watching and treatment of animals.

The screw-worm fly is the only species in the south-west of the United States which penetrates the sound tissues of animals, but other flies attack the diseased tissues of wounds and soiled wool. These flies are:—the black blowfly (*Phormia regina* Meigen), green bottle fly (*Lucilia sericata* Meigen), and gray flesh flies (*Sarcophaga texana* Aldrich, *S. tuberosa* var. *sarracenioides* Aldrich, *S. robusta* Aldrich).

All these flies breed in decaying animal matter, especially in carcasses of large animals. If all dead animals were properly disposed of no cases of infection of living animals would occur.

The best method of control is the burning of carcasses. This reduces the danger of infection by anthrax, tuberculosis and similar diseases in the pastures and prevents the breeding of flies in the carcasses. If it is not possible to burn the carcasses they should be buried, covered with quicklime (especially if the death of the animal may be attributed to an infectious disease) and then covered with at least 2 feet of soil.

Methods of controlling the parasite in cattle are:—avoidance of injury, calving at a time when the flies are not abundant (between December 1 and the middle of April, and, in the north, from November 1 to June 1), destruction of ticks, performance of surgical operations (castration. dehorning, etc.) in winter or the beginning of spring, poisoning and trapping the flies. To prevent the larvae from infesting the wool of sheep, lamb early and dip and clip soiled sheep. To avoid dehorning, hornless types may be bred. The animals must be continually watched so as to discover the first symptoms of infection, and the larvae killed with chloroform, the wounds being then treated with pine tar to repel the flies.

305—**The Cause and Prevention of Hairless Pigs, in the United States.**—Welch, Howard, in *Montana Agricultural College Experiment Station, Circular* 71, pp. 37-47. Bozeman, Montana, 1917.

It has been known for some years that, in certain of the Northwestern States, the new-born of all the domestic animals were in some way defective. New-born pigs were hairless and seldom lived; the calves were often hairless and more frequently had goitre. The young of sheep and goats were similarly affected, while new-born foals, though neither hairless nor having goitre, were weak, seldom able to stand and usually died.

In Montana, the loss is probably heaviest in young pigs, for about 10,000 are estimated as dying from this cause annually. In some localities pigs are the only domestic animals affected, while in others, it may be lambs only. It is a disease of definite localities, occurring in Montana in the drainage basis of the Yellowstone, the lower Missouri, the Musselshell and some of the smaller tributaries; outside this zone, a number of scattered cases constitute about 5% of the total loss. In some cases, the pig crop can be saved on moving the pregnant sows a mile or two out of the affected district during gestation. The malady varies curiously: one year it may cause 95% loss, and nothing the year after. There are also variations in a single pen of pregnant sows. Pigs born in March and April are more often affected than those born in May and June, while autumn-born pigs are frequently normal even in badly affected districts.

Amongst causes of the trouble have been suggested:—contagious abortion; alkali in the soil; some particular feed, such as alfalfa, flax, maize, or wheat; or some deficiency in the soil or water. All these causes have been studied by the author, but negative results were always obtained.

Post-mortem examinations showed:—that the hairless pig has a thick, pulpy skin, especially round the head, neck and shoulders; that the thyroid gland was very hypertrophied and the heart not fully developed. The developement of goitre and the hairless condition are of related gravity. This lead the author to suppose that goitre was the cause of the disease, and he found, by analogy with human goitre, that the hypertrophied thyroid glands contained much less iodine than the normal quantity, or even none. He therefore concluded that the cause of the malady is lack of iodine in the food and water given to the animals, and that it was worth testing whether this insufficiency could be compensated for by giving potassium iodide. Tests made with pigs (with 129.5 to 324 mgm, of potassium iodide per head per day), with female breeding stock during gestation, gave positive results. Iodide of potassium given to a pregnant female prevents goitre appearing in the newborn. Therefore, it is advisable to feed iodine to pregnant animals in regions where goitre is prevalent.

320—**On the Use of Certain Marine Algae for Feeding Horses.**—Adrian, in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. CLXVI, No. 1, pp. 54-56. Paris, January 7, 1918.

321—**Relation between the Weight of the Carcass and that of the Meat in Beef Cattle**—Dechambre, in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. IV, No. 1, pp. 25-28. Paris, January 9, 1918.

The meat obtained from an animal is equal to the difference between the net weight and the total weight of the bones, suet, etc. The most important of these factors is the carcass, a knowledge of which would form a sound basis for the selection of slaughter breeds.

The relation between the weight of the carcass and that of the meat is influenced by many factors, such as age, sex, breed, maturity, and, above all, the condition of the animal produced by the degree of fattening. The author's experiments to determine this relation were carried out with a large number of animals, representing a total weight of meat of 51,031 lbs. in quarters containing 9,788 lbs. of bone. The average ratio of bone to meat is, therefore, 19.18%. The extent of fattening greatly influences this ratio. It is usually expressed by the yield per cent in meat, which is the ratio between live weight and the weight of the quarters. In the meat studied the extent of fattening is dependent on the amount of suet removed for preserving. The author, therefore, determined this amount and calculated its ratio to the weight of the quarters. When this ratio is compared with that between the bone and meat, it is seen that the figures vary inversely:—the fatter the animal the lower the proportion of bone.

The author's conclusions are:—1) in medium fat and fat cattle, which generally give a net yield of meat varying between 55 and 58 %, the ratio between bone and meat is between 16 and 18 %; 2) in animals in good condition, yielding 50 to 52 %, the ratio is, on an average, 20%; 3) in animals yielding less than 50 % (47 to 49%), the ratio rises to 22 %, or a little more (22,63 %), though still below the 25 % generally admitted in the meat trade.

322—**A Statistical Study of Body Weights; Gains and Measurements of Steers During the Fattening Period**—SEVERSON, B. O., and GERLANGH, P., in the *Journal of Agricultural Research*, Vol. XI, No. 8, pp. 383-394. Washington, D.C., Nov., 1917. (6 pp. in Institute Bulletin).

323—**Influence of the Degree of Fatness of Cattle upon their Utilization of Feed.**—ARMSBY, H. PRENTISS, and FRIES, J. AUGUST, in the *Journal of Agricultural Research*, Vol. XI, No. 10, pp. 451-472, bibliography of 8 publications. Washington, December 3, 1917. (2 pp. in Institute Bulletin).

326—**Feeding Pigs on Kitchen Waste.**—PRIME, T. F., in *The Journal of the Board of Agriculture*, Year XXIV, No. 10, pp. 1107-1109. London, January, 1918.

Finding no data on the amount of kitchen waste necessary to produce one pound of pork, the author carried out experiments on this subject. To this end he started in January 1917 to keep pigs on this food and continued during 48 weeks. Three pigs were bought on January 9, two of which were killed on March 5; four others were bought on March 10, one being killed on June 7; on September 1, five more pigs were bought. Throughout the experiment 6,104 lbs. of food were consumed, and 870 lbs. increase in live weight were obtained, or roughly , 7 lbs. of kitchen waste (potato, vegetable and fruit peelings and waste, bits and remains of food) produced 1 lb. increase in live weight. During the whole period the only other food used was 28 lbs. of meal, given during a shortage of waste. The pork obtained was of excellent quality.

FARM ENGINEERING

329—**The Work of a Tractor in Stony Soil.**—PLUCHET, E., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. III, No. 36, pp. 1037-1040. Paris, November 21, 1917.

The author advised the purchase of a 10-20 HP. tractor for a large estate at Eure-et-Loire, France, having a number of stony areas. The tractor was chosen, on the recommendation of M. Ringlemann, from amongst those tested at Noisy-le-Grand.

Paraffin was used as fuel, being so much cheaper than petrol; heavy oils of at least 39° Baume could also have been used. The tractor began work on uncultivated ground about July 15, 1917. For various reasons, such as bad weather, harvest work, holidays, etc., the tractor only worked 340 hours, or 45 days of 8 hours, from the above mentioned date up till the end of October. During this time 160.6 acres were worked to a depth of 7 to 8 inches (about 1 acre in 2.2 hours), in very stubborn and stony soil. In these soils, the usual implements and tools wear very quickly and the average work done by 1 man with 3 horses does not exceed 4,200 to 4,800 sq, yds. per day.

The 160,6 acres worked cost about $535 for fuel, lubricants, socks and new parts repairs and upkeep. The working parts of the machine did not seem to have suffered, in spite of the difficult ground The tractor was driven by the estate foremen; in spite of this, the author allowed the drivers the pay of 19 cents an hour ; on adding, for the working hours $66 to the expenses, the total became $602 and each acre worked cost $3.75. The author has only been able to estimate very roughly the depreciation of the machine, etc. Supposing that the tractor, which cost $2500, can last three years if well cared for, the depreciation would amount to about $67.60 a month, giving say $236.75 for the 3½ months of work. The total cost for the 160.6 acres would then amount to $830, or $5 per acre, which is very high for work at 7 or 8 inches deep, but little higher than the cost for the same work performed by animals.

This example again shows the advantage of machine cultivation and the great help it may afford under the present circumstances, even with imperfect machinery.

336—**Investigations of Irrigation Pumping Plants, in Montana, U.S.A.**—MURDOCK, H. E., in: I. *University of Montana Agricultural Experiment Station, Circular* No. 60, pp. 37. Bozeman, Montana January, 1917; II. *Ibid., Bulletin* No. 115, pp. 127-148. Bozeman, Montana, January, 1917. (2 pp. in Institute Bulletin).

RURAL ECONOMICS

339—**Government Lands, Leased Lands and Alienated Lands in Australia.**—*The Pastoral Review*, Vol. XXVII, No. 12, pp. 1137. Melbourne, December 15, 1917.

According to official returns there were to the end of June, 1916, in Australia, 105,422,000 acres of land belonging to private owners, while a further 56,096,000 acres were in process of being sold by the Government to private owners.

Then there were 893,054,000 acres leased, or held under various forms of tenure, and 849,159,000 acres of vacant Government lands, including roads and reserves. The position in each State is as follows:—

	Fully Alienated Acres	Alienation Proceeding Acres	Leased Acres	Unoccupied Acres
	—	—	—	—
1 New South Wales	40,363,316	19,409,656	118,865,868	19,415,580
2 Victoria	24,256,222	8,075,653	13,035,612	10,878,273
3 Queensland	16,447,382	10,776,793	332,824,905	69,070,920
4 South Australia	10,590,756	2,943,395	115,396,433	114,314,216
5 West Australia	8,125,629	13,584,076	196,772,098	406,106,997
6 Tasmania	5,125,197	1,225,924	1,939,905	8,486,574
7 North Territory	474,590	—	113,926,627	220,715,583
8 Fed. Territory	38,961	80,979	292,690	171,030
Australia	105,422,053	56,096,476	893,054,138	849,159,173

340—**Machine Sheep-Shearing and Lack of Labour in New Zealand.**—BRUCE, J. L., in *The Journal of Agriculture, New Zealand Department of Agriculture, Industries and Commerce*, Vol. XV. No. 3, pp. 134-135. Wellington, September 20, 1917.

AGRICULTURAL INDUSTRIES

342—**The Milling and Baking Qualities of Australian Wheat.**—SCOTT, P. RANKIN, and WINSLOW, F. G. B., in *The Journal of the Department of Agriculture of Victoria, Australia*, Vol. XV., Pt. 8, pp. 474-481. Melbourne, August, 1917. (2 pp. in Institute Bulletin).

343—**The Soluble Nitrogenous Matter as an Index of the Baking Quality of Flour.** ROUSSEAU and SIROT, in *Comptes rendus des Séances de l'Académie des Sciences*, Vol. CLXVI, No. 4, pp. 190-192. Paris, January 28, 1918. (1 page in Institute Bulletin).

344—**The Use of Chalk in Breadmaking.**—EFFRONT, JEAN, in the *Bulletin de la Société scientifique d'Hygéine alimentaire et d'alimentation rationnelle de l'homme*, Vol. V, No. 8, pp. 437-446. Paris, 1917.

In opposition to Messrs Lapicque and Legendre (1) who assert that the use of chalk inhibits the action of the soluble ferments contained in bran, which cause the acidification of bread, the author maintains that this acidity is not the result of enzyme action. The germinated grains may be treated with alkalis and acids in quantities 20 times higher than those at which enzymes in solution are destroyed without losing any of their active substances. Similarly, the soluble ferments of flour diluted in water can bear a temporary change in the reaction of the medium without any change occurring in the enzymes they contain. Sharps treated with chalk and then diluted in a mixture of flour and water keep all their active substances which, moreover, have no harmful effect on breadmaking.

The acidity of the flour, bad smell, bad keeping quality and the tendency of bread to go mouldy are not due to the enzymes of the bran, but to bacteria derived from insufficient cleaning of the grain and the presence of a large quantity of bran, the bacterial flora of which is richer than that of flour. The addition of 40 centigrams of chalk, as advocated in the new method has no favourable action on the acidity,

(1) See Agricultural Gazette, July, 1918, page 733.

keeping qualities, or colour of the bread. In the presence of a fresh, strong yeast the amount of chalk advised has no action on the fermentation process. If the yeast is unsatisfactory, the introduction of chalk is certainly harmful.

Everything goes to prove that chalk bread is less easy to digest than ordinary bread, since the mono and tribasic phosphates, so favourable to salivary digestion, are replaced in the new bread by insoluble tribasic phosphates which have no influence on the very important first stage of digestion.

AGRICULTURAL ECONOMICS

A STATISTICAL ENQUIRY INTO AGRICULTURAL ORGANIZATIONS IN THE UNITED STATES.

The farmers' purchasing and marketing organizations of the present time in the United States may be divided into non co-operative capital stock companies and co-operative organizations. It is unfortunate that, as we have several times noticed in this review, so many American farmers' organizations are not founded on a strictly co-operative basis, and their development is undoubtedly hindered in consequence. Among the causes for this state of affairs is the fact that the laws of the various States have specifically provided for the organization of truly co-operative societies only within the last few years, and even now many States have no special laws which do this. The present laws governing co-operation in some States are so general in character that organizations formed in accordance with them do not necessarily embody the underlying principles of co-operation. Therefore a large number of farmers' organizations have been formed under general corporation laws. Among the general public there is no clear conception of the differences between co-operative and non-co-operative forms of organization. The separation of the farmers' organizations in the United States into these two groups is not a simple task. The main point to be considered is the extent to which an organization works for the benefit of the farmer. It may never declare a dividend to those it serves and yet be of profit to them. Many grain elevators, organized as stock companies, are examples of this. They have paid out their profits in the form of dividends on stock, yet have in many cases been of benefit to all those supplying their grain because they have paid a higher price for it than that which the farmers had previously received.

The farmers of the United States have undertaken many different forms of agriculture which have given rise to different kinds of co-operative associations. We will briefly notice these.

a) *Elevators.* —The growth of the movement to establish farmers' elevators was at first very slow but gradually it gained importance. Since 1900 a number of very successful farmers' elevators have been established in the grain growing States of the Middle West. As their position became sure they began to do more than handle grain. In some districts it is usual for them also to undertake the consignment of grain, and many of them have achieved marked success in handling such commodities as coal, lumber, bricks, flour, fodder, salt, twine, oils and other supplies necessary to the farmers.

Practically all the important Middle West grain States now have State associations of farmers' elevators. These associations make it possible for the local companies to keep in touch with each other and effectively promote their interests. A number of the State associations have formed the National Council of Farmers Co-operative Associations, which represents the farmers' elevator companies where matters of interstate or national importance are at stake.

It is unfortunate that many farmers' elevator companies fail to observe co-operative principles.

b) *Creameries.*—There are approximatey 5.500 creameries and 3,500 cheese factories in the Uuited States at the present time. Most of them are situated east of the western boundary of Minnesota and Iowa. The organization of cheese factories dates from about the middle of last century and creameries for the manufacture of butter were formed a few years later. The early factories were usually co-operative in form. A number of co-operative factories were established in New England, in New York and the surrounding States. Creameries and cheese factories were not established in the North Central States until later, when the country was settled and farmers in general ceased only to grow grain and produced diversified crops. The first co-operative creamery in Minnesota was established in 1889. There are now more than 600 enterprises of the kind in that State.

The farmers' creameries have had to meet less systematic competition than the elevators, and their failures have been mainly due to deficient organization or their establishment in districts which did not afford them a sufficient supply of raw material. As a rule they observe co-operative principles better than the elevators, this fact being due to the character of their business. The production of grain is seasonal and the market for it fluctuates, and the farmers are accustomed to being paid for it at the time of delivery. Dairy production is less seasonal and the market for dairy produce more stable, while those who supply the creameries with milk are used to being paid for it once a month. It is therefore a common practice of creameries to deduct the expenses of operation, set aside the necessary reserve, and divide the net proceeds of the business among the suppliers of milk every month in accordance with the amount of butter fat each has delivered. Many of the farmers' creameries are therefore co-operative in the full sense of the word. Some of them set aside an amount which allows interest to be paid on the invested capital while others pay no interest on it. Many of them are non-stock organizations, the capital for building and equipping having been borrowed and being paid back by means of a small monthly assessment on the business done. In a few cases a creamery has bought out the holders of its capital stock with funds obtained by levying a small monthly assessment on the raw material delivered at the factory.

All the farmers' creameries are not, however, as strictly co-operative. Some pay cash for the raw material as it is delivered and therefore, as they must buy their butter fat on a safe margin, cannot work strictly on a basis of no profits. The surplus funds they obtain are divided among the suppliers of material *pro rata*, either quarterly or annually, or among the shareholders as a dividend. In some cases, but less frequently than among the elevator companies, large dividends have thus been paid.

c) *Stores.*—A number of co-operative stores were in existence about the middle of last century, especially in the New England States. The seventy-seventh half-yearly report of the Lowell Co-operative Association, which was established in 1876, shows that in the six months ending 30 June 1914, suppliers' dividends amounting to about $5,000 were distributed.

For various reasons a large number of failures have occurred among the farmers' co-operative stores. The business is less well understood by the farmer than is that of the elevators or the creameries, and he does not take its problems into consideration.

d) *Fruit and Vegetable Produce Associations.*—The marketing of the fruit crop is complicated by the perishable nature of the commodities handled and the fact that many of them are produced within certain restricted areas whereas they have to be distributed all over the United States and abroad. The fruit growers of the States have been attracted by the possibilities of marketing fruit co-operatively; and in the last twenty-five years many successful associations have been formed for this object, especially among the citrus fruit growers of California and the apple growers of the North Pacific States.

Method of enquiry.—In January 1914 the office of Markets and Rural Organization secured a list of the co-operative marketing organizations in the United States. Question forms asking for plan of organization, etc., were sent to the organizations on this list. It is believed that the organizations which reported included most of the active businesses and that the information obtained gives a fairly complete summary of the facts as to co-operation in the United States between 1912 and 1915.

In the article in the Institute Economic Bulletin a table is given showing the total number of farmers' organizations reporting to the Office of Markets and Rural Organization in the several States and in the whole country. Of the 5,424 organizations included in the report 1,637 are grain elevators and warehouses, 1,708 creameries and cheese factories, 871 fruit and vegetable produce, 213 cotton, 275 stores, 43 tobacco, 96 live stock, and 581 miscellaneous associations.

A second table shows the type of organization, the annual volume of business, and the membership of the organizations reporting on those points for each State and for all the United States. Those that conduct their businesses as ordinary stock companies have been placed in one class and those more truly co-operative in another.

NATIONAL MILK PRODUCERS' FEDERATION OF THE UNITED STATES.

The National Milk Producers' Federation was organized and incorporated at Chicago in December 1916 and promises much for the whole milk industry. Its purposes are: an investigation of the conditions, including contracts, under which milk is sold by farmers and wholesalers; the dissemination of information as to prices, markets and grades to members of the federation and producers; the introduction of legislation as to grades and standards; the organization of milk producers' associations; and, in general, the protection of the milk industry. The membership includes organizations of milk producers, particularly those selling whole milk. At present it comprises the milk producers' associations of Chicago, Twin City, Milwaukee, St. Louis, Cincinnati, Michigan, and North Ohio, the Dairymen's League of New York, the New England Milk Producers' Association which covers the six New England States, the Tri-State Milk Producers' Association which covers New

Jersey, Pennsylvania and Maryland, and a few smaller organizations.

The federation met in Washington on 10 October, 1917, to perfect its organization, and to discuss with the Federal Food Administrator the problem of milk prices and contracts and with the Department of Justice the legal status of farmers' associations dealing with the sale of milk.

For the future the federation will maintain in Washington a representative who will devote himself to the interests of dairy-farming associations, especially in so far as the marketing of the whole milk is concerned.

SETTLEMENT OF EX-SERVICE MEN IN CAPE COLONY.

An offer to set aside for British ex-Service men 2,000 acres of the irrigated area known as the Cape Sundays River Settlements was made in March 1915 to Sir Rider Haggard, then on his mission round the empire for the Royal Colonial Institute. The property in question is some twenty five miles from Port Elizabeth, the seaport of the eastern province of Cape Colony, and is served by the main railways from Port Elizabeth to Cape Town and Johannesburg. The company owning it was formed some years ago and has the object of providing land suitable for settlement by desirable British and South African settlers. The climate on this property is entirely healthy, the soil unsurpassed; and the crops which can be cultivated profitably are numerous. Citruses form the main crop and are marketed in Europe in the summer when they are out of season in the northern hemisphere. Lucerne, mealies, apples, pears, beans, figs and olives are other crops; and bees and poultry can be kept as a good secondary source of profit.

The director of Immigration for the Union of South Africa has described the scheme for colonization by soldiers and sailors as "one of the most favourable closer settlement schemes which the Union is ever likely to produce."

The company has now definitely reserved 2,000 acres to be known as the Royal Colonial Institute Block. The land will be divided into blocks of 20, 30 and 40 acres, the latter to be the maximum area allotted although a settler may acquire further land outside this area. There will be a qualified staff of advisers who will keep in touch with the settlers and will, if necessary, arrange for the execution of such preliminary work as first ploughing, fencing and transport, the cost of these undertakings to be added to the purchase price. The settler's initial outlay will thus be reduced.

The special price which British ex-service men will pay is $150 per acre of irrigable land, cleared of bush, stumped and ploughed to a depth of nine or ten inches. The purchase price will bear interest at the rate of 6 per cent; 20 per cent thereof will be paid in the sixth year of occupation and the balance in the four following years. The settler will therefore pay only interest in the first five years in which he is establishing himself.

It is considered necessary that he should have a working capital of $2500.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN.

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the February number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

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AGRICULTURAL STATISTICS

AREAS OF CEREAL CROPS IN THE NORTHERN HEMISPHERE

Countries	1918	1917	Five years' average 1912–16	1918 compared with	
				1917	Five years' average
	acres	acres	acres	%	%
WHEAT:					
Denmark	141,000	138,000	144,000	102.4	98.4
Spain	9,997,000	10,134,000	9,827,000	98.6	101.7
France	11,927,000	10,397,000	14,179,000	114.7	84.1
England and Wales	2,665,000	1,919,000	1.891,000	138.9	140.9
Scotland	67,000	55,000	64,000	121.8	105.4
Italy	10,873,000	10,556,000	11,887,000	103.0	91.5
Luxemburg	23,000	22,000	27,000	104.8	85.1
Sweden	279,000	280,000	284,000	100.0	98.3
Switzerland	203,000	139,000	110,000	146.2	184.5
Canada (a)	15,838,000	14,756,000	12,557,000	107.0	126.0
United States	58,881,000	45,941,000	52,558,000	128.2	112.0
India	35,342,000	33,029,000	30,554,000	107.0	115.7
Japan	1,458,000	1,236,000	1,193,00	118.0	122.3
Algeria	3,186,000	3,222,000	3,382,000	98.9	94.2
Tunis	1,413,000	1,310,000	1,353,000	107.9	104.4
Totals	152,293,000	133,134,000	140,010,000	114.4	108.7
RYE:					
Denmark	537,000	455,000	565,000	118.0	95.0
Spain	1,989,000	1,829,000	1,883,000	108.8	105.6
France	1,942,000	2,001,000	2. 508,00	97.1	77.5
Italy	272,000	279,000	299,000	97.3	91.0
Luxemburg	16,000	17,000	25,000	94.8	63.7
Sweden	781,000	813,000	952,000	....	84.2
Switzerland	72,000	55,000	64,000	129.7	112.1
Canada (a)	229,000	212,000	126,000	108.0	182.0
United States	5,435,000	4,102,000	2,712,000	132.5	200.4
Totals	11,273,000	9,763,000	9,134,000	115.5	123.4
BARLEY:					
Spain	4,248,000	3,839,000	3,649,000	110.7	116.5
France	1,396,000	1,474,000	1,689,000	94.7	82.7
England and Wales	1,490,000	1,460,000	1,417,000	102.1	105.2
Scotland	150,000	159,000	181,000	94.3	83.0
Italy	494,000	471,000	607,000	105.3	81.4
Switzerland	22,000	5,000	4,000	440.0	550.0
Canada (a)	2,404,000	2,392,000	1,642,000	100.0	145.9
United States	9,108,000	8,835,000	7,549,000	103.1	120.6
Japan	2,721,000	2,738,000	3,106,000	99.4	87.6
Algeria	2,794,000	2,839,000	3,086,000	98.4	90.5
Tunis	1,238,000	1,038,000	1,162,000	119.3	106.5
Totals	26,065,000	25,250,000	24,092,000	103.2	108.2
OATS:					
Spain	1,506,000	1,168,000	1,347,000	128.9	111.8
France	7,227,000	6,437,000	8,502,000	112.3	85.0
England and Wales	2,820,000	2,259,000	2,030,000	124.8	138.9
Scotland	1,220,000	1,041,000	957,000	117.2	127.4
Italy	1,112,000	1,107,000	1,206,000	100.5	92.2
Switzerland	86,000	70,000	88,000	122.7	98.1
Canada (a)	13,784,000	13,313,000	10,803,000	104.0	127.2
United States	44,475,000	43,572,000	39,413,000	102.1	112.8
Algeria	588,000	682,000	542,000	86.2	108.4
Tunis	156,000	124,000	132,000	126.0	117.9
Totals	72,974,000	69,773,000	65,020,000	104.6	112.2

(a) The estimated yield of cereals in Canada for 1918, as indicated by reports on condition on July 1st are: wheat, 257,367,000 bushels; rye, 3,281,000 bushels; barley, 60,225,000 bushels; oats, 450,036,000 bushels.

UNITED STATES JULY CROP REPORT

The July report of the Department of Agriculture makes the amount of wheat remaining on the farms on July 1st about 1.3 per cent of last year's crop, or about 8,283,000 bushels compared with 15,611,000 bushels last year, and 39,056,000 bushels the average for five years.

The estimated condition and yields of the principal crops were as follows:

	Indicated Yield	Aggregate
Winter wheat	15.3	557,000,000
Spring wheat	14.8	334,000,000
All wheat	15.1	891,000,000
Corn	27.8	3,160,000,000
Oats	32.3	1,437,000,000
Rye	15.0	81,600,000
Barley	25.2	230,000,000
Flax	9.0	15,800,000
Potatoes	98.6	406,000,000
Hay—tons	1.47	102,000,000

Area seeded to corn 113,835,000 acres, compared with 119,755,000 acres last year. Potatoes, 4,113,000 acres, against 4,390,000 acres last year. Flax seed, 1,967,000 acres, against 1,809,000 acres last year.

BROOMHALL'S FOREIGN CROP CABLE, JULY 16, 1918

France.—Condition of crops, as a whole, is excellent. The outlook for winter cereals is good. Further rains have fallen which have benefited the spring crops but more moisture is needed.

Italy.—Moisture has been excessive in parts and due to the heavy rains the crop outlook in some sections is less favourable. This year's wheat outturn is expected to be moderate. Harvesting is in progress in Sicily.

Spain.—Weather has been generally favourable for the maturing of the crop and material improvement is noted over earlier indications. Rains have fallen, but there are many sections still needing moisture.

Sweden.—Much rain and warm weather served to improve the prospects of the coming harvest. The outlook is fair to excellent.

North Africa.—Harvesting in Tunis is well under way and fields are said to be satisfactory. The outlook in Algeria is very good. Expectations point to a larger outturn in Morocco than last year.

United Kingdom.—Weather has been a little cooler with less sunshine, but conditions generally remain favourable. Crops continue to make seasonable progress and the favourable outlook for the wheat crop is maintained. Some spring sown was damaged by pests, but otherwise conditions are satisfactory. Crops throughout the South of England are in full ear.

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